

RADIO AMATEUR

DECEMBER 1994
Volume 62 No 12



Journal of the Wireless Institute of Australia



IN THIS ISSUE:

- Review of ICOM IC-738 HF Transceiver
- Transportable Tiltover Tower
- PLL Carrier Detector for 7910 Packet Modem
- The Cradbig Charger

Plus lots more

DAYCOM
CATALOGUE
INSIDE

KENWOOD

...pacesetter in Amateur Radio

Compact Milestone

Kenwood unveils the world's smallest HF transceiver

HF is going places—thanks the smallest transceiver of ing high-performance com- where convenience, the freedom. And whether used DX-peditions, or in a fixed installation, this rig packs a powerful punch. Maximum output is 100W, and there's a full range of advanced features—including 100 memory channels, DDS with innovative "fuzzy" control, and AIP for superior dynamic range. IF shift and CW reverse mode help reduce interference, while a noise blanker improves clarity. For user-friendly operation on the move, there's a multi-function microphone and powerful menu system. And the TS-50S is fully equipped for split-frequency operations. Test drive one today.

TS-50S
HF TRANSCEIVER

to Kenwood's new TS-50S, its kind in the world. Provid- munications with go-any- TS-50S is your passport to for mobile operations and

**KENWOOD**

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.

(ACN 201 499 024)

P.O. Box 504, 8 Fingert Drive, Australia Centre,

Homebush NSW 2140, Australia Tel (02) 748 1519

Fax (02) 748 1509

NEW Electron Electronics Sydney (02) 211 0586

Lake Macquarie Communications Centre (043) 567 255

ACT Wally Communications Fyshwick (06) 280 8416

QLD Kenwood Communications Albion (07) 357 6630

VIC Directly Ham Baywater (03) 729 7656 Directly

Electronics Components Huntingdale (03) 543 3723

SA International Comms Systems Port Adelaide (08) 473 588

WA Leda Electronics St James (09) 361 7821

Taswell Communications, Victoria Park (08) 470 1118

TAS Egan Pty Ltd Launceston (03) 312 7111

Egan Pty Ltd Hobart (03) 344 5000

FOR AMATEUR RADIO USE ONLY

NEW

Amateur Radio is published by the Wireless Institute of Australia, ACN 004 920 745 as its Official Journal, on the last Friday of each month.

Publisher's Nominee
Bill Wardrop VK5AWM

PUBLICATIONS COMMITTEE

Editor
Bill Rice VK3ABP
Assistant Editor
Bill Roper VK3BR
Senior Technical Editor
Peter Gibson VK3AZL
Technical Editors
Evan Jarman VK3ANI
Gil Sones VK3AUI
Bob Tait VK3UI
Marketing
Norm Eyres VK3ZEP
Bruce Kendall VK3WL
Contributing Editor
Ron Fisher VK3OM

ASSOCIATE EDITORS

Technical
David Brownsey VK4AFA
Don Graham VK6HK
Peter O'Connor VK4KIP
Phil Steen VK4APA
Roy Watkins VK6XV
WIA News
Roger Harrison VK2ZRH

PROOF READERS

Allan Doble VK3AMD
Jim Payne VK3AZT
Graham Thornton VK3IY
John Tutton VK3ZC

DRAFTING

Vicki Griffin VK3BNK

ADVERTISING

June Fox
Brenda Edmonds VK3KT

CIRCULATION

Chris Russell VK3ARZ
Sue Allan

All contributions and correspondence concerning the content of *Amateur Radio* should be forwarded to:
Amateur Radio
PO Box 2175
Caulfield Junction VIC 3161

REGISTERED OFFICE

3105 Hawthorn Road
Caulfield North VIC 3161

Telephone: (03) 528 5962
Fax: (03) 523 8191

Business Hours: 9:30 am to 3 pm weekdays

Deadlines
January 05/12/94 07/12/94
February 09/01/95 11/01/95
March 06/02/95 08/02/95

Delivery of AR: If this magazine is not received by the 15th of the month of issue, and you are a financial member of the WIA, please check with the Post Office before contacting the registered office of the WIA.
© Wireless Institute of Australia 1994

CONTENTS

Technical

Equipment Review — ICOM IC-738 All Mode HF Transceiver	4
Ron Fisher VK3OM	
A Transportable Tilt-over Tower	8
"Doc" Wescombe-Down VK5HP/VK4CMY	
The CRADBIG Charger	9
Reg Carter VK3CAZ	
A PLL Carrier Detector for the 7910 Packet Modem	12
Lou Destefano VK3AQZ	
Technical Abstracts	14
Gil Sones VK3AUI	
Another Tip for Using the Noise Bridge	21
Lloyd Butler VK5BR	

General

Darwin Revisited WICEN and Cyclone "Tracy" — Christmas 1974	7
Ted Gabriel VK4YG	
Roof Top Run — January '94	18
Jack Bramham VK3WWW	
Packet Explained for the Beginner	19
Chris Davis VK1DO	
Forever Courteous	20
Bob Hawksley VK2GRY	
Book Review — The ARRL Antenna Book	69
Evan Jarman VK3ANI	

Operating

Awards	
CQ WPX Award	24
WPX Honour Roll	24
VERON Jubilee Award	24
Worked Republic of India Award	24

Contests

Canada Winter Contest	70
ARRL Straight Key "Night"	70
ARRL RTTY Roundup	70
HA DX Contest	71
CQ Worldwide 160 Metre DX Contest	71
Canadian Provinces & Territories	71
Results of 1993 SAC Contest	71
Results of 1993 ARRL 10 m Contest	71
VHF-UHF Field Day 1995 Rules	71

Columns

Advertisers Index	96	Intruder Watch	78
ALARA	22	Morse Practice Transmissions	96
AMSAT Australia	23	Over To You	80
An Old Timer Reflects	79	Packet World	80
Club Corner	28	Pounding Brass	82
Divisional Notes		QSLs from the WIA Collection	84
VK2 Notes	72	QSP News	9, 18
VK3 Notes	72	Repeater Link	85
VK6 Notes	73	Silent Keys	90
VK7 Notes	73	Spotlight on SWLING	87
Editor's Comment	3	Technical Correspondence	90
Education Notes	79	Update	87
Federal QSP	2	VHF/UHF — An Expanding World	88
FTAC Notes	77	What's New	91
Hamads	94	WIA News	6, 11, 19, 69, 77, 81, 87, 89
HF Predictions	92	WIA — Divisional Directory	3
How's DX?	74	WIA — Federal Directory	2

Cover

Are you ready for the 1995 VHF-UHF Field Day which will take place on 14-15 January 1995? Doug Friend VK4OE operated portable at Dorrigo in NSW in the 1994 VHF-UHF Field Day, and will be active in the 1995 Field Day. Of special interest in Doug's 1994 Field Day station was the array of four loop Yagis for 1296 MHz, with a homebrew mast-head power amplifier using four Mitsubishi M57762 power modules.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society Founded 1910

Representing the Australian Amateur Radio Service

Member of the International Amateur Radio Union

Registered Federal office of the WIA:

3/105 Hawthorn Rd, Caulfield North, Vic 3161

All Mail to:

PO Box 2175, Caulfield Junction, Vic 3161

Telephone: (03) 528 5962

Fax: (03) 523 8191

Business Hours: 9.30am to 3.00pm on weekdays

Federal Secretary and Office Manager
Donna Reilly

COUNCIL

President	Neil Penfold	VK6NE
VK1 Federal Councillor	Richard Jenkins	VK1RJ
VK2 Federal Councillor	Peter Kloppenburg	VK2CPK
VK3 Federal Councillor	Alan Noble	VK3BBM
VK4 Federal Councillor	Ross Marren	VK4AMJ
VK5 Federal Councillor	Bill Wardrop	VK5AWM
VK6 Federal Councillor	Bruce Hedland-Thomas	VK6OO
VK7 Federal Councillor	Jim Forsyth	VK7FJ

FEDERAL CO-ORDINATORS

AMSAT:	Graham Ratcliff	VK5AGR
Awards:	John Kelleher	VK3DP
Contests:	Peter Nesbit	VK3APN
Education:	Brenda Edmonds	VK3KT
EMC:		
FTAC:	John Martin	VK3KWA
Historian:	John Edmonds	VK3AFU
Honorary Legal Counsel:	George Brzostowski	VK1GB
IARU:	Kevin Olds	VK1OK
Int'l Travel Host Exch:	Ash Nallawalla	VK3CIT
Intruder Watch:	Gordon Loveday	VK4KAL
Media:	Roger Harrison	VK2ZRH
QSL Manager(VK9,VK0):	Neil Penfold	VK6NE
Standards:	Roger Harrison	VK2ZRH
Videotapes:	Bob Godfrey	VK4BOB
ITU Conference and Study Group:	David Wardlaw	VK3ADW
WICEN:	Leigh Baker	VK3TP

Federal QSP

Perhaps, since this is effectively the Christmas issue, I might be permitted to say something about religion. "What!" I hear you say. "Bring religion into Christmas? Whatever next?"

I was fortunate enough to have grown up in those halcyon days when inflation was a constant and predictable low percentage and there was something called the basic wage linked to the cost-of-living. So you could be sure that anything bought on hire purchase would be paid for by regular wage increases. There were more vacancies than people to fill them and everyone leaving school was certain of a job. Anyone who had the ability and wanted to go to university was guaranteed a place and it was as close to being free as could be.

We are told that things had to change because the tariff barriers which were protecting Australian industry made it very inefficient, so that it was costing the taxpayer a lot. Was it costing the taxpayer more, I wonder, than the ten percent unemployment we seem to have exchanged it for?

But how things have changed. Now everyone has to compete for the few jobs in a manner reminiscent of the Chicago meatworks in 1922. Only those with an aggregate score above a particular value are able to compete with each other for the limited university and college places. Nursing is no longer a vocation and the places for student nurses are reserved for those with the best marks in maths and physics. Our judicial system has always been an adversarial system where, instead of seeking for the truth, the better presented case will be the winner. Everything seems to be competitive and polarised. If I have the job, you haven't. If you are right, then I must be wrong. Disagreement is everywhere. This is no less true of the amateur movement and has even been known to occur within the WIA Federal Council!

So I come at last to religion and the religion I want to talk about is the Quakers or The Religious Society of Friends to give them their full name. If they have a disagreement or a problem they refuse to settle it by a majority vote and leave a minority feeling disgruntled. Nor are they satisfied to achieve a consensus, which is only another way of saying compromise, in which no one is completely satisfied. They will go on talking until they find a solution which everyone can conscientiously accept. And the unexpected delight of all this is that often a novel and original solution will emerge that would not otherwise have been thought of.

Could we not as amateurs move against the trend to confrontation and settle our differences by looking for what is good or rational or acceptable in each others' position and try, for as long as it takes, to build on it to achieve a true agreement. This could be good practice to prepare

for the SMA's intended policy on the resolution of interference issues. No longer will we be able to adopt a holier-than-thou attitude and too bad for the neighbour so long as our transmissions are clean. The SMA will expect the parties to resolve the problem by mutual agreement and assistance, with the SMA acting as a consultant. If the problem remains unresolved it may act as arbitrator or refer the parties to a conciliator.

Something else which has changed is the meaning of the word "merry". In the original meaning of the word, I wish you all a Merry Christmas.

Bruce Hedland-Thomas VK600
VK6 Federal Councillor
ar

Editor's Comment

Consensus

I am about to confess to shameless plagiarism of the theme of Bruce Hedland-Thomas on the adjacent page, because it is so appropriate to our present situation, be it in employment, local, State or Federal government, and even, as Bruce says, in WIA affairs.

It was at the October meeting of Federal Council that Bruce gave me his draft QSP, and I suspect that he, as well as I, thought much about its

aptness as discussions proceeded. I would differ slightly about the meaning of the word "consensus", though. I feel it implies something more praiseworthy than "compromise", being in fact the best way of resolving all differences.

Bruce refers to society these days being "polarised", and again his assessment is "spot on". It is a fact that few things are entirely right and few entirely wrong, but usually fall somewhere on the grey-scale spectrum in between. Most of the world's problems are caused by those who doggedly insist on identifying with the extremes.

May I also wish you all a very merry Christmas and a happy New Year.

Bill Rice VK3ABP
Editor
ar

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division	Address	Officers	Weekly News Broadcasts	1995 Fees	
VK1	ACT Division GPO Box 800 Canberra ACT 2601 Phone (06) 247 7006	President Rob Apathy Secretary Len Jones Treasurer Don Hume	VK1KRA VK1NLJ VK1DHF	3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.	(F) \$70.00 (G) \$55.00 (X) \$42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Freecall 1800 817 644 Fax (02) 633 1525	President Michael Corbin Secretary Puxie Chapple Treasurer Terry Ryeland (Office hours Mon-Fri 11.00-14.00 Mon 1900-2100)	VK2PFQ VK2KPC VK2UX	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 ("morning only") with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2m, 70 cm, 23 cm. Voicemail highlights on (02) 724 8793. The broadcast text is available on packet.	(F) \$66.75 (G) \$53.40 (X) \$39.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9281	President Jim Linton Secretary Barry Wilton Treasurer Rob Hailey (Office hours Tue & Thur 0830-1530)	VK3PC VK3XV VK3XLZ	1.840MHz AM, 3.615LSB, 7.085LSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Milourra, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.	(F) \$72.00 (G) \$58.00 (X) \$44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Murray Kelly Secretary Lance Bickford Treasurer Roger Bingham	VK4AOK VK4ZAZ VK4HD	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) \$72.00 (G) \$58.00 (X) \$44.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Garry Herden Secretary Maurine Hooper Treasurer Bill Wardrop	VK5ZK VK5EA VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 148.825, 438.425 (NT) 3.555, 7065, 10125, 146.700, 0900 hrs Sunday	(F) \$72.00 (G) \$58.00 (X) \$44.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 434 3283	President Cliff Bastin Secretary Ray Spargo Treasurer Bruce Hedland-Thomas	VK6LZ VK6RR VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.	(F) \$60.75 (G) \$48.60 (X) \$32.75
VK7	Tasmanian Division 148 Denwent Avenue Lindisfarne TAS 7015 Phone (002) 43 8435	President Andrew Dixon Secretary Ted Beard Treasurer Phil Harbeck	VK7GL VK7EB VK7PU	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNV), 3.570, 7.080, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) \$69.00 (G) \$55.65 (X) \$40.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).				

Note: All times are local. All frequencies MHz.

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three-year membership available to (F) (G) (X) grades at fee x 3 times.

■ Equipment Review

ICOM IC-738 All Mode HF Transceiver

*Reviewed by Ron Fisher VK3OM**

As the saying goes, "when you're on a good thing, stick to it". At the same time, however, a few updates and improvements will never go astray. First, there was the IC-737 which I reviewed in the August 1993 issue of *Amateur Radio*. Then, with a few slight changes, the IC-737A. Now, with even more improvements, the IC-738.

Let's look at the first two quickly and then the new IC-738 in detail. Of course in between all of these, ICOM brought out the IC-736 which I reviewed in the July 1994 issue of our magazine. All four transceivers are closely related and from a distance would be impossible to pick apart.

Back to the beginning. The IC-737 was a high performance rig which lacked a few desirable features such as VOX, RF gain control and adequate metering. The IC-737A partially overcame this by adding VOX. The IC-736 included an RF gain control, better metering and, of course, six metre coverage as well as a built in AC power supply. It also introduced a one Hz tuning rate and display. There was no provision to operate the transceiver from a 12 volt

DC supply so the IC-736 is a dedicated base station only. Enter the IC-738 with all of the operating features of the IC-736, less six metres and the AC power supply.

The IC-738 is 12 volt powered so it is suitable for mobile or portable operation. For home station use you will need an external 13.8 volt power supply such as the PS-15, PS-30 or the PS-55, all of which are available from your ICOM distributor.

Features and Facilities

In order to save you referring to my two earlier reviews, I will run through the main features of the new IC-738. For a mobile transceiver it is fairly large. It is a bit difficult to relate this to ICOM's latest advertisements that claim "ICOM radios are getting sleeker and slimmer". It looks as if Duncan has lost a kilo or two but I am not so sure about the IC-738!

The overall dimensions are 111 mm high, 330 mm wide and 285 mm deep. Overall weight is 8.6 kg. One of the highlights of the series is the large LCD readout. Illuminated in bright orange with black numerals, the intensity can be adjusted by an

internal preset control. Following on from the earlier models, the "S" meter is rather dull. The transmitter covers all amateur bands from 160 to 10 metres while the receiver has full coverage from 30 kHz to 30 MHz. Operating modes for both transmit and receive are SSB, CW, AM and FM. The transceiver comes with three filters, a 2.1 kHz for SSB and CW, a 6 kHz for AM and a 12 kHz for FM.

Narrow CW filters are available as options. The one Hz tuning rate and readout introduced on the IC-736 is there in the IC-738. Front panel layout is unchanged from the IC-736 and the number and location of controls are the same as the original IC-737. However, the compression level control has been shifted to the rear panel to make way for the RF gain control and the "tune" button is now the meter switch. Meter functions are: "S" meter on receive and ALC, RF power output and SWR on transmit. These are selected sequentially with each push on the meter button, with the LCD indicating the mode selected. One important difference between the IC-738 and the IC-736 is that the final RF amplifier on the 738 is powered from the 13.8 volt line whereas the 736, with the benefit of an AC power supply, allows its final to run from a 40 volt line. However, as we shall see later, the intermodulation distortion performance of the IC-738 is very good none-the-less.

On The Air

I found it virtually impossible to pick any differences between the 738 and the 736. Again, an ICOM HM-36 hand microphone was supplied and, for the tests, I also used an SM-6 desk microphone. Transmitted audio was again rated as thin and slightly harsh. The speech processor was effective in adding a degree of punch to the signal. A generous 100 watts was obtained on all bands and intermod distortion was found to be better than -30 dB, an excellent result for a 13.8 volt powered transceiver. Overall, the receiver performed very smoothly except for the rather muffled audio response. The AM performance, in particular, sounded very woolly.

There was almost no difference in audio quality between SSB reception of an AM signal and the actual AM mode. I measured -15 dB at 3 kHz on



ICOM IC-738.

the IC-736 and it sounded just as bad on the IC-738. My guess is that the receiver audio amplifier has a sharp cut off above about 2 kHz and this affects all modes. There might well be a simple modification to overcome the problem. No doubt time will tell.

All of the great operating features of the IC-736 are retained with such things as the double band stacking register, the memo pads for quick entry of temporary memories and, of course, the one hundred and one normal memories all of which are fully tunable. Also the front panel key pad allows direct frequency input.

On Test

It soon became obvious that the overall performance of the IC-738 was identical to the IC-736 in almost all parameters except, of course, that the IC-738 does not operate on six metres. To save referring to the earlier IC-736 review, I will run through a few of the more important test results. Transmitter power output in the CW mode was in the range of 124 watts

on 160 metres to 107 watts on 10 metres. It is possible to reduce the power output down to about five watts with the "RF PWR" control. This control operates on all modes. Transmit intermodulation distortion was estimated to be just in excess of -30 dB as referred to normal SSB speech output which is very good for a 12 volt powered transceiver.

On the receive side, the sensitivity in SSB mode at 14.2 MHz was 0.14 μ V for 10 dB SINAD. The "S" meter indicated S9 with an input of 20 μ V measured with the "Preamp" switched in. Sensitivity and "S" meter indication was even across the bands. Once again I was not impressed with the quality of AM signals so I repeated the tests I carried out on the IC-736. The results were much the same. The -6 dB points were at 250 Hz and 2.2 kHz with the response down -16 dB at 100 Hz and 3 kHz.

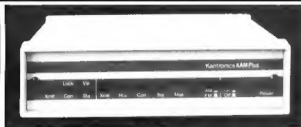
The notch filter produced a notch depth of -28 dB, however, I thought that the notch width was a bit too wide

at the top giving a rather hollow sound to the audio. Audio power output is excellent with more than the specified 2.6 watts being produced at less than 10% distortion and the product detector distortion still an amazing 0.3%. Stability tests came up with an even better result than I found in the IC-736, with total drift of less than 15 Hz over an extended operating period. Again I would very much like to try an IC-738 with the optional high stability master oscillator installed. Over all, an excellent result.

The IC-738 is one of the best performing transceivers on the market at the moment. Pity about the transmitted and received audio quality.

IC-738 Instruction manual

The instruction manual for the IC-738 also doubles for the IC-736. Well, why not. After all, the operation is exactly the same in 95% of their functions. The format of the book is very much the same with excellent



**The incomparable
KAM+ for a mere:**

\$649!

Don't forget our ICOM Day on December 17th! Call for details!

DAYCOM
COMMUNICATIONS Pty. Ltd. Copyright © 1994 Daycom Communications Pty. Ltd. All rights reserved. Prices do not include freight or insurance and are subject to change without notice. ACN 061 819 949

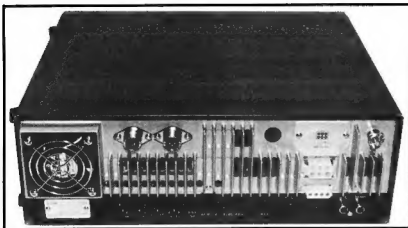
**Come join the party!
DAYCOM is ONE year old!**

And for our first birthday you get a chance to join the digital revolution with one of the finest products in the market!

- ★ Dual Ports
- ★ HF & VHF Packet
- ★ G-Tor and Pactor
- ★ AMTOR Modes A & B
- ★ AMTEX / NAVTEX
- ★ RTTY (Baudot & ASCII)
- ★ CW (5-99 WPM)
- ★ Sophisticated PBBS
- ★ Can use different modes on VHF and HF simultaneously!

37A Fenton Street, Huntingdale 3166
P.O. Box 206, Oakleigh 3166

Bankcard, MasterCard Phone (03) 543-6444
& Visa all welcome FAX (03) 543-7238



Rear panel of the IC-738.

line drawings to describe operation. Photographs detail several adjustment points that could come in handy in the future. Again there is no technical description of how the IC-738 works. On the basis that the manual now covers two different models, I am going to drop my score rating one point to seven out of ten.

IC-738 Conclusions

There is no doubt that ICOM have responded to a demand for increased operating facilities with the IC-738. However, I have to ask a few questions. Why weren't they included in the original IC-737, as I asked in my original review? So, having gone this

far, why not a bit further? The biggest surprise is that an inbuilt AC power supply is not offered as an option. There is certainly room for it, and one fits very well into the IC-736. My other wish is that the positions of the RF gain and the squelch controls should be changed over, with the RF gain concentric with the AF gain and the squelch positioned as the minor control. Then, with a meter position for measuring compression, the IC-738 (or will it be the IC-739?) would rival the top-of-the-line transceivers on the market at the moment.

The IC-738 is priced at \$2901.20 which is nearly \$300 up on the price of the original IC-737. Of course, the IC-738 replaces both the IC-737 and 737A and these are no longer available.

Thanks to Duncan Baxter for the loan of our review IC-738 transceiver. For further information on availability of the IC-738, give Duncan a ring at ICOM on (008) 338 915.

*24 Sugarloaf Road, Beaconsfield Upper VIC 3808

BF

WIA News

Packet Radio Users and the Law

Since a telephone computer bulletin board user in West Australia copped a \$40,000 judgement in a defamation action earlier this year (see *WIA News*, May issue), there has been protracted debate among the radio amateur community about the liabilities of packet radio use.

Under the current radiocommunications regulations governing the amateur service, any packet radio station forwarding messages is responsible for their content. Add to this the situation under defamation law that any station operator transmitting or forwarding a message originating from another station having defamatory content is a "knowing publisher", even though their station automatically forwards messages. The originator and all forwarding stations are liable under defamation law.

The problem is, a practice has allegedly arisen in which packet operators use the call signs of other stations to transmit messages which are possibly defamatory or otherwise in breach of the amateur regulations. Suggestions have been circulated that the "problem" could be readily circumvented by using software which provides for packet message "authentication" by users. Such authentication software employs encrypted character strings embedded in the packet message, but there has been concern that the use of this type of software may also transgress the amateur regulations.

A spokesman for the SMA has advised, in responses to individuals, that the existing and foreshadowed amateur regulations allow the use of such encrypted strings for authenticating packet messages. The SMA spokesman

has also indicated the Agency would be reluctant to legislate that authentication be mandatory, or to specify a particular system. Reduced regulation, wherever possible, is the aim.

To be on the safe side, packet BBS operators should store and view messages to confirm that the contents are not libellous or in breach of amateur regulations. Even with authentication, the SMA spokesman points out, Section 108(d) of the Radiocommunications Act 1992 places the onus on all licenses, including packet BBS operators, not to permit their stations to be used to affront, alarm or harass other people.

In the USA, the FCC places the onus on the originator and first PBBS station to keep the content of messages within the law. In Australia, it is every operator's responsibility.

■ History

Darwin Revisited WICEN and Cyclone "Tracy" — Christmas 1974

Ted Gabriel VK4YG recalls the momentous events of 54 and 20 years ago.*

This Christmas day marks the 20th anniversary of the devastation of Darwin by Cyclone "Tracy" and the massive relief effort to aid the stricken city and its citizens.

It was also the greatest challenge faced by WICEN and amateur radio operators. How this emergency was handled is fully described in the article "The Christmas of '74" in *Amateur Radio* of June 1985, Vol 53, No 6, page 18.

The WICEN National net for Darwin was activated by VK4YG and John Roberts VK4TL in Cairns when a request by Bob VK8RR, the Manager of OTC Darwin, for an urgent message to his headquarters in Sydney, that the OTC and VID, Darwin shipping radio, transmitter site had been wrecked.

This was the first official traffic which was handled by a WICEN operation that lasted for seven days and involved many amateurs nationwide and included the marathon effort by Slim Jones VK8JT at the Darwin Base Station.

My first acquaintance with Darwin was in May 1940 when, as a young RAAF pilot, I was posted to No 12 GP

Squadron located on the civil aerodrome at Parap.

In June 1940 the Anson flight was moved to the new RAAF base to form No 13 GR Squadron, flying Lockheed Hudsons.

No 13 was involved in action against the Japanese in the area north of Australia. It won many battle honours and was, along with No 2 Squadron, awarded the United States Presidential Unit Citation.

My next visits to Darwin were in the 1950s as a pilot with Qantas. The city had recovered from the wartime bombing raids, was growing steadily and shedding the image of a wild and isolated frontier style town.

Following cyclone "Tracy" Darwin was again rebuilt, this time to modern building standards and cyclone regulations, to become an attractive tropical city.

The years passed and in 1990 I returned to take part in the 50th Anniversary of the RAAF base and the honouring of No 13 Squadron as the "City of Darwin Squadron".

*PO Box 245, Ravenshoe QLD 4872

BT

**Have you advised the WIA
Federal Office of your new
callsign? Use the form on the
reverse of the Amateur Radio
address flysheet.**

icom

Count on us!



"VK3LZ calling!"

All the latest news from your friends at Icom.

A Dual Band Handheld for under \$600!

The amazing factory-backed offer of the IC-W21A for under \$600 continues.

Another shipment is due to arrive shortly so call and I'll advise you where to find stock.

Don't miss out on this opportunity, it is the bargain of the year!

Buying an old rig?

Key spare parts for some of the very old rigs are no longer available. If you are considering buying an old rig or upgrading, call and I'll advise you.

"...73"

Call me at Icom on
free call (008) 338 915
ph: (03) 529 7582
fax: (03) 529 8485

ACN006 092 575

ILLUSTRATION: ANDY

■ Antennas

A Transportable Tiltover Tower

"Doc" Wescombe-Down VK5HP/VK4CMY describes the antenna mast that you might just be looking for.

This project

- cost less than \$50 to build
- suits CLUB and INDIVIDUAL use
- is transportable (when dismantled) and suits fixed base or field day application
- supports HF, VHF or UHF arrays
- may be guyed or unguyed
- assembles/disassembles in less than 30 minutes
- can be built by one person in one day
- can be handled and erected by one person
- suits temporary use including caravan parks

We may start with a 70 cm diameter x 12 mm thick steel baseplate to which 2 x 30 cm long x 50 mm steel tubes are mounted. These will sleeve into the two 6 metre heavy-wall cradle section steel pipes and locate them in place.

A recycled 200 litre (44 gallon) drum has the top removed and 2 x 50 mm holes drilled in the base (along

with other water drain holes around the drum base rim) so that it slides over the 30 cm steel tubes and then sits on the steel base plate. For more substantial operations, the 200 litre drum may be bolted to one, two or three additional drums which, when filled with ballast, increase both the base area and base mass and thus enhance all weather stability.

Once the drum is in place, the 6 metre cradle section is lowered into the drum and located on the two 30 cm pipe locaters. Large pieces of local rubble, buckets of gravel, etc may then be used to fill the drum — this provides the base mass of stability whilst the base plate adds both mass and area to the base.

After ensuring the cradle section is vertical, the hinge is assembled and the 6 metre lattice mast section bolted in place, tilted over to the ground. A stepladder is needed for this assembly. Details of the hinge assembly are shown in Figure 1

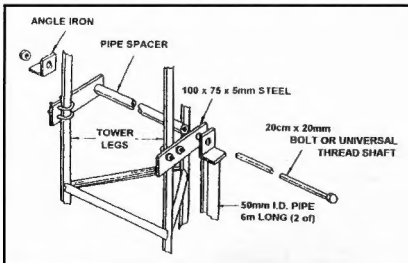


Figure 1 — Hinge bearing detail.

(copied from "HINTS AND KINKS FOR THE RADIO AMATEUR ARRL 1974") but note that two U-bolts should appear on each 100x75x5mm flat plate whereas the original sketch shows two on one side and only one on the other.

The lattice mast section has a 90 cm concrete counter weight poured "in situ" using 3 ply or heavy cardboard taped to the mast for formwork. The formwork may be removed the following day and the concrete counter weight kept damp for a few days.

This counter weight offsets the weight of a large HF array and may be correspondingly smaller if only VHF or UHF arrays are to be used.

The lattice mast, together with rotator and mast pipe if used, is then pulled horizontal and rested on a stepladder while the antenna is installed. The whole hinged section is then pulled vertical by a single hand rope and the locking bolt installed. The completed assembly is shown in Figure 2.

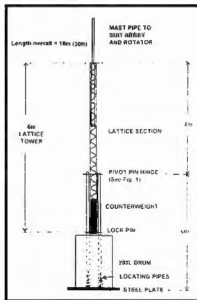


Figure 2 — Complete tower assembly.

More sophistication may be obtained by using a gin pole with boat winch, but it's not essential. Overall height is 10 metres (without masthead pipe) and I have used a 4 element 15 m/6 element 10 m quad on a 9 metre boom atop this unit quite successfully.

Some Council by-laws prohibit permanent antenna installations in excess of 10 m in height but, if such a transportable unit were built using a base support of 4 drums bolted together (Figure 3), stability without permanence could be achieved if the installation were to be a bit taller than 10 m.

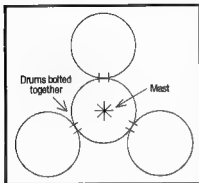


Figure 3 — Top view of tower assembly.

Parts List

- 1 x 200 litre (44 gallon) drum
- 1 x bag of concrete mix
- 1 x 70 cm diameter x 12 mm thick steel plate
- 2 x 30 cm x 50 mm OD heavy steel pipes
- 2 x 6 m x 50 mm ID steel pipes (2.5 mm wall)
- 1 x 6 m x 15 cm triangular mast section (OR single pipe mast as an alternative)

Assorted pieces of strap iron etc for cradle section crossbracing (within 200 litre drum)

Hinge hardware (see Figure 1), paint to suit, welding rods, packing tape to hold formwork.

*C/P: Post Office Between Qld 4374

MR

QSP News

Did your November copy of *Amateur Radio* arrive late last month? Did you wonder why?

Well, it was delivered on time to the mailing house on the last Friday in the month, but they had a machine failure which took several days to fix.

However, it was worth waiting for, wasn't it?

■ Technical

The CRADBIG Charger

Reg Carter VK3CAZ says it's "Crude, Rude And Disgusting But It Goes!" and then tells how.*

During the months either side of the midwinter solstice a friend, reliant on Solar Panels to charge 360 Ah of 12 volt batteries powering his home, finds his rig pulls the energy out faster than the solar cells can put it in.

Consequently there was a need for a good 20 to 30 A battery charger. There are plenty of petrol-driven 12 volt (nominal) generator sets on the market but being designed to run 12 volt appliances they are pretty useless at charging batteries. As soon as the battery voltage nears 13 volts or so the charging current drops off and it takes a lot of petrol to fully charge the battery. A car alternator as supplied is really no better since it, too, is designed to run the car's electrical systems with its charging of the vehicle battery a somewhat secondary feature. Once the battery reaches 13.8 volts or so it ceases to charge at any appreciable rate and so fails dismally as a charging system.

So we set out to make a battery charger with a good output, starting off with a small 3 1/2 horsepower petrol engine mounted on a steel frame. A second-hand alternator (Lucas in our case) was obtained, checked out for serviceability and

then stripped down. The stator windings and output diodes were left strictly alone but all the regulator side feeding the rotor, or excitation coil, was removed leaving just the two brush holders. One of these brush holders was connected to the frame of the alternator and the other brush connection brought out as an external connection. Once the alternator had been re-assembled it was mounted on the frame so that it could be driven by a "Vee" belt (in the correct direction as shown by the arrow stamped on it) at about 2 to 2 1/2 times engine speed, as determined by the size of the pulley fitted to the driving engine. Then the alternator output connection and the frame of the alternator (its negative output terminal connection) were connected to the batteries via an ammeter capable of reading 40 A. The new connection for the excitation coil was returned to the positive output terminal of the alternator via a 32 cp (approx 18 watt) automotive direction indicator globe and an on/off switch as shown in Figure 1.

Once the petrol engine had been started and had warmed up, we ran it up to a speed of 1400-1500 rpm

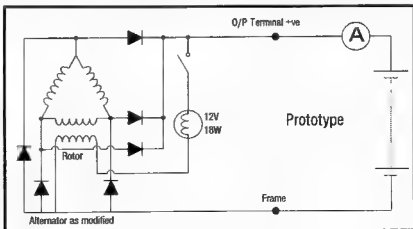


Fig 1.

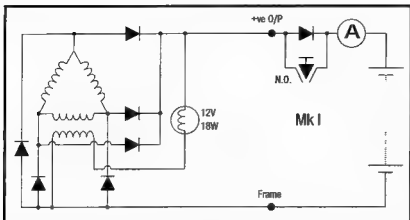


Fig 2.

Then the switch was closed so that (by later measurement) a current of about 2.2 A flowed in the rotor. The alternator was delivering around 20 A to the battery and this could be increased to 25-30 A by increasing the engine speed. The series globe in the excitation circuit provided a measure of output stabilisation since it was not at full brilliance and so if the output voltage of the alternator rose so did the resistance of the globe and consequently the excitation was reduced. We had a virtually constant voltage charging system.

This first model delivered about 60 Ah per litre of petrol so at Ballarat prices it was about 0.82 c per Ah. I rather like the new unit of Ah/l so will use that!

This prototype did, however, possess two flaws, one minor and the other major. The minor flaw was that if the petrol engine stopped for any reason some of the hard-won charge flowed back from the battery through the excitation coil and was wasted in lighting the series globe, until the switch was opened. This flaw was overcome by fitting a 70 amp diode, mounted on a heatsink, in series with the output lead and fitting a momentary-contact, normally-open, push-button switch rated at about 5 A to bypass the diode. The switch in series with the globe was removed and the lamp wired permanently to the output terminal connection, see Fig 2

Mark I

Now, in operation, once the petrol engine was running correctly the

push-button was momentarily depressed allowing the battery to initially excite the alternator. Once released the alternator excited itself and delivered its output. If the engine stopped, the diode, being reverse-biased, isolated the battery from the charging system thus remedying the first flaw.

The major flaw was that the system was so simple that there was little to go wrong and if the globe, the only thing that could fail, went open-circuit the system was "fail-safe". That, of course, is no way for an amateur-built thing to behave, so it had to be made more sophisticated so as to increase the probability of failure. By the way, have you ever looked up the original and still true meaning of the word "sophisticated" especially when used in the perfume industry. I am glad I make no claims of being sophisticated!

Anyway, in an attempt to

complicate the issue it was contemplated that we replace the single globe with three globes, of 6, 12 and 18 watts rating, each controlled by an individual on/off switch. This, it was felt, would permit the selection of six different charging rates as selected by single switches or combinations of switches. The Mark IA as shown in Fig 3, was still-born as it was deemed not to be complex enough nor fallible enough!

It was finally decided that the only way to introduce enough fallibility into the system was to use semi-conductors to control the excitation current. This, it was felt, would ensure sufficient failures to provide the maximum inconvenience when using the charger.

Thus emerged the Mark II controller as shown in Fig 4. This was built and proved disgustingly reliable and successful, giving outputs up to 40 A and being capable of so loading the engine as to stall it!

The semi-conductors were fitted with, or to, heatsinks; these being a "flag" for the BD139 and a Minifin section for the 2N3055. The whole unit was built into a metal box with the two large heatsinks for the 2N3055 and series diode being mounted on opposite ends.

Take your pick of excitation schemes but be warned that this is NOT a power supply, it is a battery charger! If you consult a GOOD book on the subject of lead-acid secondary cells, most of which you will find were written quite some years ago, it will point out that the terminal voltage of a lead-acid cell at "top of charge" is

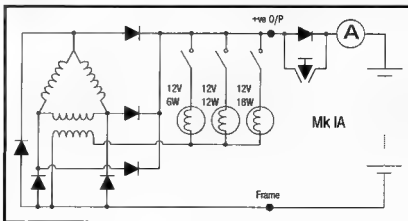


Fig 3.

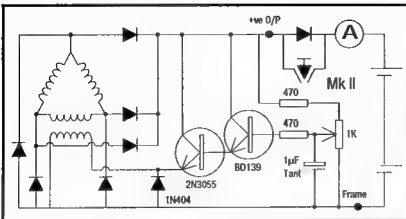


Fig 4.

between 2.5 and 2.8 volts per cell dependent on several factors including temperature, charge rate and acid density among others. That means that the terminal voltage of your battery when fully charged can be as high as 16.8 volts. If you allow for a little internal resistance such as is found in "the old battery used for field days" and have a charging current of 15-20 A then it may well exceed 17 volts. Should you be stupid enough to connect your precious rig

to a supply of that value it won't like it at all and you may let all the brown smoke out of the components so they don't work at all! So remember, if you build something like this, it is a **BATTERY CHARGER**.

Eric VK3FRO did all the hard work of making up the frame and mounting the bits plus turning my suggestions into hardware and any credit should really be his. Anyway the Mark II has delivered 30 A continuously for six hours without distress at a rate of about 75 Ah/l (I like that unit!)

Good luck and have a go choosing whichever Mark takes your fancy and will meet your needs. But remember, "what isn't there can't go wrong".

MF

WIA News

Family Membership

A proposal from the VK7 Division that a "family membership" grade be investigated, has been recommended to the Federal Council by Jim Forsyth VK7FJ, Federal Councillor for VK7. The proposal is to be investigated by the new Federal Secretary, with a view to reporting to Council as to costs and feasibility at the next quarterly meeting in February, next year.

The NZART has a family membership grade. Details of its operation was described to the Federal Council by NZART delegates who attended the WIA's Federal AGM in May.

Strictly Ham Pty. Ltd. ACN 059 636 407

14 Church St, Bayswater. VIC. 3153
PH: (03) 729 7656 FAX: (03) 729 7422

ALL NEW KENWOOD MOBILES



TM-251A 2m DATA MOBILE

- ✧ 1200/9600 BAND PACKET
- ✧ 41 MEMORIES (EXPANDABLE TO 200)
- ✧ 5 METER SQUELCH
- ✧ BUILT IN DIGITAL RECORDING
- ✧ DUAL BAND RECEIVE
- ✧ 50 W OUTPUT POWER



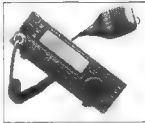
TM-255A 2m ALL MODE

- ✧ 1200/9600 BAND PACKET
- ✧ DETACHABLE FRONT PANEL
- ✧ ALL MODE OPERATION
- ✧ 101 MEMORY CHANNELS
- ✧ TWIN TUNING DIALS
- ✧ 40W OUTPUT POWER



TM-733A DUAL BAND MOBILE

- ✧ 1200/9600 BAND PACKET
- ✧ DETACHABLE FRONT PANEL
- ✧ DUAL RECEIVE VHF & UHF
- ✧ 72 MEMORY CHANNELS
- ✧ 5 METER SQUELCH
- ✧ 50/35W OUTPUT POWER



TS-60S 6m ALL MODE

- ✧ 100 MEMORY CHANNELS
- ✧ DUAL VFOs
- ✧ DUAL MENU SYSTEM
- ✧ ALL MODE SQUELCH
- ✧ COMPUTER CONTROLLABLE
- ✧ 90W RF OUTPUT

CALL FOR PRICES

G 084A7A

Digital

A PLL Carrier Detector for the 7910 Packet Modem

Lou Destefano VK3AQZ* further improves his packet modem.

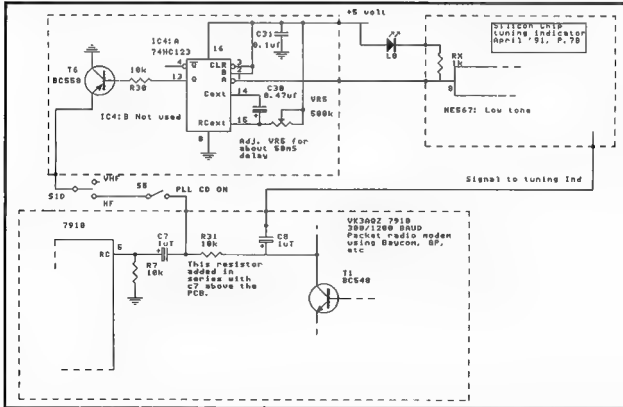
The 7910 300/1200 Baud packet radio modem uses the carrier detector function within the 7910 chip for determining channel activity. Some software uses the chip's carrier detected squelch to commence transmission. In addition to the presence or absence of data, Baycom also uses software bit count detection, and this can be selected by setting the Carrier parameter to 0 or 1. Because the 7910 was designed for telephone line use, the carrier detect circuit triggers with moderate levels of noise, and thus prevents the

software from commencing transmission, even though the channel is clear of packet signals. Software detection is an improvement, but still not satisfactory. This problem mainly affects HF packet. VHF packet normally uses FM, which uses a separate mute in the receiver, and thus does not present a problem.

The modem circuit I built incorporated a tuning indicator system published in Silicon Chip, which uses a pair of phase locked loop chips (NE567) as narrow band

tone detectors. It was noticed that the tuning indicator LEDs did not come on with noise as readily as the carrier detect LED on the 7910. Because the NE567 is a PLL device, a tone needs to be received before it locks up properly. Using this information, I built a simple interface between the tuning indicator and the 7910 which acts as an audio squelch into the 7910. The circuit consists of a re-triggerable monostable (74HC123) which is driven by the NE567 and turns a squelch transistor off in the presence of one of the packet tones.

The tuning indicator uses one PLL chip for the packet low tone and one for the packet high tone. It was found that it was only necessary to interface to one detector and a small delay used to span the time interval of the other tone. The delay was also necessary to stop the squelch transistor pulsing the input to the 7910 at the data rate and confusing the modem. After some experimentation, I adjusted the timing trimpot for around 50 to 100 msec. If this time is too long, your transmission delay will be extended, which will slow up the



data throughput. The 74HC123 consists of two monostables and it was intended to use one for each tone. However, this is not necessary and so the other one is left unused.

The output of the monostable is fed into a PNP transistor (T6) which is connected to the junction of the coupling capacitor feeding the input of the 7910 (pin 5), and a resistor going to the collector of the amplifier transistor, T1. Resistor R31 is added by removing the positive lead of the 1 μ F Tantalum capacitor from the pcb, and placing the resistor between this flying capacitor lead, and the pcb hole. Make sure the resistor goes into the correct hole which takes it to the collector of T1 and effectively provides DC power to the squelch transistor. If you have a CRQ, connect it to the junction of R31 and C7 and observe the unmuting action of T6 when the low tone LED lights up. Adjust VR5 so that there is no pulsing at this point with packet data, and a suitable delay exists after the tone drops off.

The monostable input is derived from pin 8 of the NE567 and this point goes low when the correct tone is received. It is a negative going pulse and so it is fed into the negative trigger input of the 74HC123. The Q output of the 74HC123 is used to drive the PNP squelch transistor. When the Q output is low, T6 is turned on and effectively shorts the incoming audio to ground. When the Q output goes high, the transistor turns off and the audio is allowed to enter the 7910. I could have tried to squelch the TTL side of the 7910 output, but I was concerned about the effect of pulsing the data line on and off. However, the extra delay available using that method would be beneficial. With the method used here, you can observe the carrier detect LED coming on and off, which is handy when setting the receive level. After the addition of this circuit, I find I can turn the audio level up considerably higher before noise starts to affect the packet transmission.

The muting transistor connects to

the main pcb via an on/off switch and a fourth pole of the VHF/HF selector switch. This disables the muting function on VHF as it is not needed. The other switch was added so that I could observe the effectiveness of the mute, and also disable it if I felt it affected the receive in any way. In practice I now leave it on all the time. As there are only a few parts I built the unit on a small IC test pad PCB board that you can buy from Tandy and other electronics hobby suppliers. A piece of matrix board would also suit.

*7 Worthing Road Devon Meadows VIC 3977

BT

**Help stamp out
stolen equipment
— always include
the serial number
of your
equipment in
your Hamad.**

amateur radio action



“ Ηουσε αδωερπισμενι Π φορ Αματευρ
Ραδιο Αχτιον μαγαζινε το αππεαρ ιν
ΩΙΑ φουρναλ Αματευρ Ραδιο Π.”

For subscription details to just
about anywhere, phone Grant
Manson on (03) 601 4222

*If all this looks Greek to you, perhaps it's because you're not
reading the authoritative source — Amateur Radio Action
magazine... at your local news outlet every fourth Tuesday.*

Number 200 Page 1

Technical

Technical Abstracts

Gil Sones VK3AU

Peg Vice for Printed Circuit Boards

Holding and manoeuvring components and printed circuit boards together with other tools is difficult. A holder or vice is useful but they can be expensive if used infrequently. A simple and cheap device was described in the October 1994 issue of *Radio Communications* in "Novice Notebook" by Ian Keyser G3ROO. The idea comes originally from John G0FZW and uses nails, clothes pegs, and a piece of board to produce a versatile vice for holding a printed circuit board (PCB) while you work on it.

Parts count for the device is very small being only four nails, four clothes pegs and a scrap of wood. The pegs should preferably be made of wood with a spring closer.

The Peg Vice is shown in Fig 1. A suitable piece of board is selected as the base for the device. A scrap of particle board or the offcut from a plank would be suitable. A matrix of holes is drilled in the base to suit the size of the nails being used. The holes should be slightly larger than the nails and should be drilled about 10 mm deep.

The clothes pegs should be wooden, for preference, but plastic could be used. Drill a hole in each peg to suit the nails being used. The nails should have their heads removed. Insert the blunt head end of the nails into the holes in the pegs. You may be able to just push the nails tightly into the holes in the pegs. A spot of glue may be required.

This simple device will free your hands while working on a printed circuit board.

To use the vice the pegs are clipped to the edges of the PCB and the nails slipped into suitable holes in the base. The PCB is then conveniently supported whilst inserting components. To solder the parts place a piece of cardboard over the PCB and invert the board and reclip the pegs to hold the PCB whilst soldering and trimming leads.

This simple device will free your hands while working on a printed circuit board. The cost is very small and the device can be quickly made to suit the job on hand.

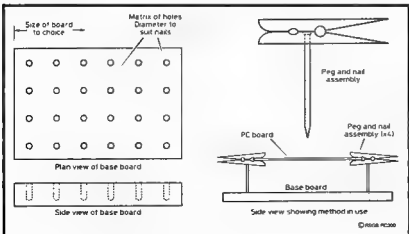


Fig 1 — Nandy Peg Vice designed by G0FZW.

Simple HF Fox Hunt Equipment

A simple technique to use a small portable radio as an HF direction finder was published in the August issue of *QST*. The authors were O G Villard Jr W6QYT, G H Hagn and J M Lomasney WA6NIL from SRI International.

The system uses a small portable radio, such as a SONY ICF 7600, held on a metal plate. An enhancement to reduce user body effects is the use of a simple Faraday cage made from a mailing tube and wire.

Basically the radio is mounted on a square conductive plate with the whip antenna extended along the diagonal of the square plate (see Fig 2). The antenna should always be in the plane of the plate. Fig 3 shows how the radio's whip is pointed end on with respect to an incoming radio wave. The wave has parallel fronts and so the whip is aligned so as to be perpendicular to the electric field. No RF current is induced in the whip except as a result of field distortion caused by the radio itself. If the re-radiated energy is electrically symmetrical with respect to the whip, however, the antenna will still null the signal.

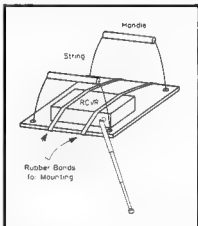


Fig 2 — Receiver Mounting on conductive plate. The whip should lie along the diagonal and be in the plane of the plate. Rubber bands hold the receiver in place.

By mounting the radio on a conductive plate as shown in Fig 2 the reflected energy is symmetrical. In the null direction neither the incident wave nor the backward

directed symmetrical receiver scatter induce signal energy into the whip and the radio. The null direction is the diagonal of the plate extended in the direction of the whip. The result is a clean null if there are no additional signal sources present.

Small portable receivers are thin enough to mount face up on the metal plate. The radio is grounded to the plate and is then effectively part of the plate. The plate could be a sheet of printed circuit laminate. The plate plus receiver as shown in Fig 2 and Fig 3 are equivalent electro-magnetically to the plate alone. A good null is obtained when the incident wave is aligned with the receiver whip. The wave re-radiated from the receiver also has a null in that direction. The whip must lie along an extension of a diagonal of the plate and must be in the same plane as the plate.

The length of the whip is not critical. A long whip will give a bigger signal but may be awkward. If the whip is too short the reduced sensitivity will be accompanied by a poorer bearing accuracy. The plate can be a sheet of metal or a piece of printed circuit board laminate or even a card covered in aluminium cooking foil. The plate should be somewhat larger than the radio so as to accommodate the shape of the radio and the asymmetric whip mounting on the radio.

The whole setup is suspended from non-metallic strings and held clear of your body whilst rotating it to find the null. Elastic bands should be used to secure the radio to the plate. This will help maintain the radio position fixed with respect to the plate and help you to avoid dropping it. The null will be along the line of the whip and the diagonal of the plate.

To reduce sensitivity and make a null more apparent a partial Faraday shield can be used. This is placed over the whip and it will also help with re-radiation effects from nearby objects such as your body. The screen can be made simply and cheaply from a plastic or cardboard tube by taping some wires to it. The construction is shown in Fig 4. A suitable tube would be a mailing tube or an offcut of plastic conduit.

Body absorption can be used also

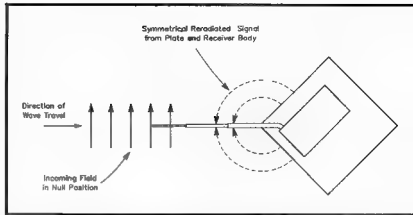


Fig 3 — Field lines of the incoming wave are perpendicular to the whip and induce no voltage in it. The receiver mounted on the conductive plate is symmetrical with respect to the whip. Parts of the end-on incoming signal wave are uniformly scattered and don't upset the antenna null by inducing voltage into the whip.

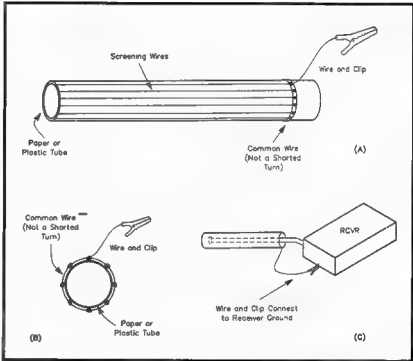


Fig 4 — Faraday shield over the whip reduces signal pickup and makes directional nulls more apparent. (A) is a side view. (B) is an end view. (C) shows the Faraday shield in place. Use tape to hold the wires in place.

as a check on the direction. Hold the radio with the whip in the Faraday screen vertically against your body and turn around. The signal will suffer greatest absorption to your rear where body absorption is greatest. This can be used to check the null obtained.

This seems to be a simple

technique but it could be used to good effect backing up other more sophisticated equipment. It would also be useful in tracking down noise sources with simple equipment. You should be ready to explain to interested onlookers though as the strange antics will not go unnoticed!

■

THE 21st CENTURY COMM. RECEIVER IS HERE TODAY

THE FABULOUS

SoftWave

SoftWave is the first truly integrated digital communications receiver for Microsoft Windows. SoftWave combines a high performance receiver, digital signal processor, spectrum analyzer, database and Windows program in one product. It opens the door to wireless communications on the PC.

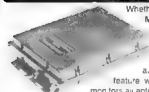
GENERAL FEATURES:

Includes HF receiver, VHF Scanner, AM DX Radio, World Map Radio, Digital Signal Processor, Spectrum Analyzer, Oscilloscope, Signal Constellation, Multi-Band Demodulator, Decoder, Database and Windows program in one product.

TOO MUCH TO TELL YOU - GET YOUR BROCHURE!

The SG-230 Smarttuner

HERE AT LAST



Whether you are a HAM, LAND MOBILE, MARINE or AIR BAND operator, you need an efficient antenna coupler. The best on the market today is definitely the SG-230 made in USA by SGC Inc. The SG-230 is a fully automatic antenna tuner with locking feature where a computer system continuously monitors all antenna parameters and instantly selects the right values from more than half a million combinations in its matching circuit to make sure everything is perfectly tuned. With 500 position non-volatile memory built in, and a memory management program, there is only one word for SG-230: HF AUTOMATIC ANTENNA COUPLER - RELIABILITY!

PRICE \$795

UNIVERSAL M-8000v5

THE MOST ADVANCED

More sophisticated and powerful than ever before. Modes include: Morse, Baudot, B1 Inverted Baudot, Vanabe Baudot, ASCII, Packet, Factor, Sisor A, Sisor B, ARQ 2.54 (TDM), ARQ E, ARQ E3, ARQ E90, FEC-A, FEC-S, ARQ-S, SWED, ARQ VFT (FDM), Piccolo, Possag, Golay, ASARS and breath-taking FAX. Also will display to screen: Russian, Cyrillic, Literal mode and Databit mode. Automatic and variable shift. Auto speed readout and auto tuning.

Selects MSI/USO diversity reception, level control, dual tuning indicators, memories and more. Serial and parallel print ports and VGA color monitor output. Many more features!

\$2995

TWO UNIQUE NEW EMTRON POWER SUPPLIES

NEW RELEASE: EPS-20s

It's the EMTRON new switching mode power supply which would comfortably run any of your HAM RADIO TRANSCEIVERS at 13.8Vdc and 20Amp peak!

ONLY \$ 295

THE BEST 30A POWER SUPPLY AVAILABLE! EMTRON EPS-30



This unique PS incorporates "4X" protection (voltage, current, temp. & RF) and a dual CROSS-NEEDLE meter for continuous monitoring of voltage, current and DC power.

\$575

KENWOOD & ICOM

Best prices from EMTRONICS



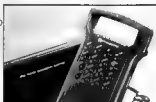
STANDARD

NEW TECHNOLOGY- NEW CONCEPT

No more "CRAWLING" under the DASHBOARD to read the dial. Now all controls are in your hand!

C5718D

A new PACKET-READY TWIN BAND 50W transceiver with out-of-the-box high speed 9600 baud interface for both VHF & UHF bands. Just connect your TNC. Built-in antenna duplexer. Wide band reception. 40 memories (200 memory optional). Full duplex with CTCSS tones. Many more exciting features! Call for brochure!



C1208D

All your controls and display dial are in the SPEAKER/MIC!

A full featured 2-meter rig that fits anywhere, yet puts out a full 50 watts as well - that's STANDARDS NEW C1208D. Super wide RX range, 100 memories, stores frequency offset & CTCSS tones and many other features!



NEW

JST-145/245

HF/HF+50MHz transceiver



Complete with BUILT-IN SWITCHING POWER SUPPLY, AUTOMATIC ANT. TUNER, POWER MOSFET, SEPES SYSTEM and features that only a six page colour brochure can describe.

PROFESSIONAL NEW ANTENNA/RF ANALYSERS

AEA SWR-121 IS A PROFESSIONAL ANTENNA TEST INSTRUMENT

It shows a precise display of SWR curve independent of the feedline. With optional software you can save plots on disk and control from your computer's keyboard. The SWR-121 is a highly descriptive instrument in any RF laboratory. Indispensable in design of RF transformers, RF matching networks and can be used as a accurate GDO. In the right hands the SWR-121 is a miracle! Available for HF & VHF/UHF bands.

PROCOM- PROFESSIONAL SWR-ANALYSER with built-in signal generator.

A sturdy, handy, simple and cost-effective SWR meter covering all major radio communication bands from 65 to 1000MHz.

SWR 66-470 and SWR 400-1000.

- SAVE TIME
- MAKE QUALITY ANTENNA INSTALLATIONS
- S.M.P.I.F.Y. TROUBLE SHOOTING using PROCOM's new compact all-in-one SWR analyzer



SWR 121 (HF) \$ 795 SWR 121 (VHF/UHF) \$ 550



* Antenna tuning and control without transceiver
* Measure SWR and bandwidth
* Contains everything needed: SWR bridge, RF generator, frequency and SWR readouts. INDISPENSIBLE! EVERY RADIO-TELEPHONE WORKSHOP
PRICE AND BROCHURE ON REQUEST

TET-EMTRON ANTENNAS

DON'T BE DECEIVED BY INFERIOR COPIES AND MISLEADING ADVERTISING!

We do not mind anybody copying our antenna designs. We actually take it as a compliment. However copying the design as well as the name of the antenna as done by one antenna manufacturer is another matter. Please note: there is only one original and genuine HB35c antenna on the market! The TET-EMTRON one. They can copy the design. They can copy the name but they can NEVER match the performance and quality! All TET-EMTRON antennas are made from marine grade stainless steel hardware and 6061T83 drawn aluminum tubing and are manufactured to the maximum possible accuracy. TET-EMTRON antennas are now exported worldwide!

DIGITAL RADIO COMMUNICATION

AEA DATA CONTROLLERS

represent the most exciting value in amateur radio today. DSP/MULTI-MODE DATA CONTROLLERS. The internal software provides all popular digital, amateur data modes. Unique LCD read-out on the DSP-232 displays the mode and diagnostics for both channels.

DSP-1232 \$1495 DSP-2322 \$1895



PK-900: THE STEPPING STONE BETWEEN '232MBX & DSP-2322

With features borrowed from the '2322' plus unique additions: dual simultaneous ports, software selectable modems, 9600 baud modem & FACTOR etc.

\$1250

PK-232MBX, MULTI-MODE DATA CONTROLLER

PK-232MBX, the world's leading multi-mode controller combines a 'amateur data communication modes in one comprehensive unit.

ONLY \$695



PK88 HF/VHF PACKET TNC BEST VALUE IN PACKET RADIO!

The PK-88 is loaded with unique features and backed with proven hardware and software design.



ONLY \$295

PK95-A HIGH SPEED PACKET CONTROLLER

Tired of waiting for packet data? Wish for an easy solution? Now there is one: the PK-95, a cost-effective high-speed single mode data controller.



ONLY \$499

PC-PAKRATT FOR WINDOWS

PC PAKRATT for Windows makes control of your AEA Data Controller easier and more enjoyable! \$250

AEA FAX II

Tired of waiting for Weather Reports on Television. Buy AEA FAX II \$275

NEW-NEW-NEW-NEW-NEW ST-1 SATELLITE TRACKER to control your KENPRO 5400/5600!

THREE BAND BEAMS FOR 14-21-28 MHz BANDS

TE-13	rotatable dipole	\$199
TE-23	2 element beam	\$418
TE-23M	2 ele mini-beam	\$448
TE-33	3-element beam	\$575
TE-43	4-element beam	\$750
HB-35C	5-element trapless beam	\$770



FOUR BAND BEAMS FOR 7-14-21-28 MHz BANDS

TE-14	rotatable dipole	\$275
TE-34	3 ele beam on 14-21-28MHz	\$695
TE-44	4 ele beam on 14-21-28MHz	\$870

SIX BAND BEAMS FOR 10-14-18-21-25-28 MHz BANDS

TE-26	dual rotatable dipole	\$380
TE-46	3 ele beam on 14-21-28MHz	\$750
TE-56	3 ele beam on 14-21-28MHz	\$950

SEVEN BANDERS: 7-10-14-18-21-25-28 MHz antennas

TE-47	3 ele on 14-21-28 MHz	
TE-57	1 ele on 7-10-18-25 MHz	

Famous ED-52c, 5 band wire trap antenna in stock again!

SHORTWAVE COMMUNICATION RECEIVERS

At Emtronics you can source the largest range of Short wave Radios for professional, amateur and SWL. We also supply SW receiving antennas & accessories!

HF 225 only \$1450

LOWE ELECTRONICS presents two brilliant new receivers with the awards 'Best Portable Receiver 1989/90' by World Radio Handbook 'Most Innovative Design 1992/93' by World Radio Handbook 'Best DX Receiver' by EDXC Conference 1992

HF 150 only \$1050

NEW AOR: AR3030

General coverage receiver with mechanical filter, DDS and ECSS. AOR has introduced new standards in receiver design. With DDS, ECSS and Collins mechanical filters brings the AR3030 receiver in the \$4000 class.



\$1599

AOR: AR-3000A

The 'TOP' of all communication receivers-scanners is the famous AR-3000A. This multi mode radio covers a freq. range from 100KHz to 2036MHz.

\$1950

BEST SCANNER



JRC: NRD-535G

World's best short wave receiver. Superb features include double front end tuned circuit, optional ECSS band pass tuning, all mode reception memories, search, scan & sweep and modular construction.



LNA-3000 is a low noise wide band preamplifier for the freq. range between 50 to 3000MHz. Ideal for improving scanner.



enhance weather satellite TV & radio signals, and to increase the sensitivity of test instruments.

NEW AOR AR8000

AR8000 is a new breed of radio which combines full compatibility with computer and advanced wide-band receiver technology.

A highly sensitive hand held receiver boasting a very wide frequency coverage of 500 KHz to 1900 MHz continuous. The all mode reception provides AM, SSB, CW, FM & WFM with independent 40 KHz SSB filter as standard. **SOFT RESONANT! TOO MUCH TO TELL HERE! CONTACT US**



SYDNEY & HEAD OFFICE
94 Wentworth Ave
SYDNEY 2000
Ph (02) 91 0988
Fax (02) 281 1508

QUEENSLAND
633 Logan Rd,
GREENSLOPES
QLD 4120
Ph (07) 394 2655
Fax (07) 394 4316

WEST AUSTRALIA
TOWER COM,
Shop 3, 443 Albany
Hwy, VICTORIA PARK
Ph (09) 470 1118
Fax (09) 472 3795

VICTORIA AGENT
JOHN HILL
Ph (03) 700 5428

Roof Top Run — January '94

Jack Bramham VK3WWW found out about the Roof Top run in the best way short of actually running in the event. His account was previously published in the EMDRC Bulletin.*

I had been looking forward to this event for quite some time so, with eldest daughter Erica in tow, we left Melbourne on New Year's Eve headed for Falls Creek. Upon arriving there we decided to move out further to escape the New Year's Eve revellers. We found a few family groups at Langsford's Gap West caravan park who had decided that 2130 was close enough to celebrate the new year.

Saturday, 1 January. Temperature 2.5°C.

The weather was looking fine for our 8 km hike from Watchbed Creek to Roper's Hut. We were to join up with two other hikers but by 1230 they had not arrived so we pressed on. This is where the hard work started, with Erica complaining that her pack was rubbing. I relieved her of it and strapped it to the top of mine. With this problem out of the way we continued on and after many rests finally arrived at Roper's Hut around 1600. We were both totally exhausted and it took me about thirty minutes to recover sufficiently for the job of setting up antennas.

Bob VK3UI had told me that this location was bad for transmitting so I had brought in a 4 element Yagi, a 6 m mast, a small 2 m linear, two 6.5 Ah gel cells, a 1.2 Ah gel cell, a dual band HT and a 2 m HT plus plenty of patch leads, power cables, tools, etc. I was determined to open up either VK3RNE or VK3RHO. While setting up the mast I had left my 2 m HT monitoring VK3RNE, but not expecting to hear anything. I was surprised to hear Bob come on. Did this mean that I didn't need all the extra equipment? A quick call to Bob confirmed that I was readable into the repeater on 5 watts using a rubber ducky antenna. Didn't Murphy say

something like "if you don't have it you will be sure to need it". I proved that the reverse is also true "if you take it you won't need it".

Sunday, 2 January

At 0545 the VK3AWI operator stirred us into action with a wake up call. Weather conditions were not good. With gale force winds on the summit of Bogong and also Mt Hotham the runners were in for a tough time. Light rain had been falling since about 0430.

The race started at 0623 but the first runner was not due to reach our checkpoint until about 0915 so there was plenty of time to have breakfast and prepare ourselves. Our checkpoint was manned by myself, my daughter and two ladies who had an interest in the race but also wanted to experience some of Victoria's beautiful high country.

We could hardly believe that the first runner to reach us had just run from Mountain Creek at the base of Mt Bogong, up the staircase to the summit, along to Maddison's Hut, down across the Big River and up Duane Spur following the Alpine walking track to our checkpoint. He looked as though he had just started 200 metres down the track! Most of the runners were in a similar state but this fellow continued in this vein throughout the entire event. Even after he had run the 60 km from the start to the finish at the summit of Mt Hotham he still had enough energy to run from the summit down to where his car was parked, get a pullover and then run back up to the top again in time to watch the next competitor arrive!

At 1330 the last bunch of runners arrived at our check point. After strapping up one slightly sprained ankle and feeding them with fruit,

lollies and chocolate we filled their water bottles and they were on their way again. Our job was over and we could pack up our gear for the walk out. The return trek was a bit easier for me as I had by this time managed to offload about 14 kg of gear onto the back of a friendly hiker. Back at the car we stowed everything away and headed for the "Cosy Kangaroo" in Bright where it was good to eat some real food and chat to some of the other operators and also a few of the runners.

Monday, 3 January 0045

Back home again after a very enjoyable experience but, for the life of me, I can't work out who is crazier, the runners or us! Later in the afternoon before putting everything away I weighed my pack as it would have been when we started out and it came to 43 kg excluding the water bottle and food. Be assured, next year the contents will be severely pruned. On second thoughts perhaps I should just enter the race instead. Hi! Hi! Thanks to Bob and the boys for a very well organised event.

*46 Nuriendi Road, Vermont VIC 3133

ar

QSP News

Canadian Radio Amateur Elected to Key ITU Post

At the ITU Plenipotentiary Conference in Kyoto, Japan on 30 September, the International Telecommunication Union (ITU) elected Canadian radio amateur Robert W Jones VE3CTM to replace retiring Richard C Kirby W0LCT as Director of its Radiocommunication Bureau.

VE3CTM is currently the Director General of the Radio Regulatory Branch, under Industry and Science Canada, which regulates amateur and other radio service. His work with the ITU began in 1975 in preparation for the 1977 and 1979 World Administrative Radio Conferences (WARCs). He attributes his professional interest in radiocommunications to having become a licensed radio amateur as a teenager in 1959.

News item supplied by David Wardlaw VK3ADW

■ Digital — Humorous

Packet Explained for the Beginner

Chris Davis VK1DO originally wrote this humorous look at packet radio for the ACT Divisional broadcast.*

Here in the ACT, the packet group have done their usual excellent job presenting a back to basics evening. You might have missed it? However, it's not too late. Now you can absorb the wonderful novelties and unique qualities of the renowned world of packet. Here are a few valuable tips.

This specially prepared article is written by our skilled correspondent whose background includes diverse keyboard experience, and an innate knowledge of matters packet. What this writer doesn't know about packet is anyone's guess.

So then, back to basics. Some readers will be baffled by the terminology used in many technical articles. Just read on steadily and the jargon and terms will be broken down word by word, term by term.

First there is the term Packet. Some misguided types have tried to propagate some nonsense about data communications and the way in which the mode sends data in groups called packets. This is incorrect. The term PACKET stands for **Protocol Arranging Common Knowledge Excluding Truth**.

The term KISS stands for **Keep Interfering Several Stations simultaneously**.

Some operators who have experimented with the mode TCP/IP somehow manage to delude themselves that it is some sort of fast reliable file transfer mode. A routine examination of the band during its operation will reveal that TCP/IP stands for **Transmit Continuous Packet Interference Progressively**.

Having covered some of the terms relating to protocols and modes, perhaps I should cover some of the terms you are likely to encounter when you have actually connected to

someone or something. Firstly there is BULLETIN. In day to day life this is a well respected journal. In packet it means something quite unrelated. BULLETIN stands for **Basically Useless Listing Lacking Entertainment Taste Interesting Nobody**.

DIGIPEATING is another misunderstood term bandied about by the nervous packet gurus who try and disguise what they are actually up to. Some creative types have claimed that DIGIPEATING relates to the extension of one's range by using another person's station.

DIGIPEATING actually stands for **Don't Install! Good Isopols Purposely Every Antenna That Infiltrates Nowhere Goes**.

So what about NODES? NODES stands for **Nobody On Deck Except Sysop**. Sysop is another one. SYSOP stands for **Send Your Signals On Phone**.

Then there is NETROM of course. A very useful cheery abbreviation. NETROM stands for **Nothing Else To Report Old Man**.

Don't forget RETRY. RETRY stands for **Really Expecting To Respond Yesterday**.

Another popular term is LINKSTATE. LINKSTATE stands for **Last Item Not Known Send To Anywhere Trace Excluded**.

BBS stands for **Band Busy Still**. And last but not least there is BYE. Once you type this on your terminal, BYE describes what is happening on the band while you are away. **Burning Your Ears**.

I hope you feel enlightened! So, NETROM for now.

*123 Hawkesbury Cres Farrer ACT 2807

BT

WIA News

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of October 1994

L20980 MS H GODSALL
L20981 MR H GUTTE
L20982 MR D E ROBINSON
L20984 MR H J ROWLAND
L30902 MR W CHRISTIE
L50325 MR D P GLYNN-ROE
L50326 MR J B WHITEFORD
L50329 DR C J TYSON
VK1ARA MR A R A DAISUKE
VK2CAP MR H PREHN
VK2IBF MR A KENZIAN
VK2MOM MR B SHIPTON
VK2MON MR A TURVEY
VK2QC MR K SHARPE
VK2TDT MR D J TAYLOR
VK2TFT MR E M STRINGER
VK3FCA MR D HUF
VK3JXX MR I MANSON
VK3MWW MS M WILLIAMSON

VK3ZJB MR J A BLANCH
VK4APK MR P W KIECK
VK4CPG MR C P GERHARDT
VK4CXB MR G E HAYWARD
VK4DZB MR G O BRAND
VK4EJ MR B T MCIVOR
VK4IF BRISBANE VHF GROUP
VK4SKL MR A M MCCASKILL
VK5AFA MR D J RAYNER
VK5AGT MR W C FRYER
VK5AJK MR J J KLEINRAHM
VK5JI MR V J M BOSHER
VK5KTD MR M J A WHITING
VK5LTD MR C LARWOOD
VK5NFJ MR J F T
NIEUWENHUIZEN
VK5NWH MR W R HOLMAN
VK5PBF MR G C NICHOLSON
VK5RC MR R SCHESTAVIN
VK5SE MR K P THOMPSON
VK5ZEA MR M CAREY
VK5ZIK MR R W DUNCAN
VK5ZIJ MR S C ADKINS
VK7LS MR L A COOPER
VK7MAJ MR A J TABART

■ Operating

Forever Courteous

Bob Hawksley VK2GRY has a word or two about the old-world niceties of CW operating.*

In this troubled world there's a group of individuals embracing every race and creed but who are distinguished from the rest of mankind by being courteous to a fault. Dating from the moment the trade of telegraphist came into being, today the group consists largely of ham operators whose numbers now reach into the millions.

Yet ham operators are not noted for gregariousness. Rather, they prefer to spend much of their time alone surrounded by their apparatus. Like star to faint star they call to each other across the sky and since they know nothing of rank their conversations bear witness to their love for one another.

Never in my years of CW operating have I ever copied a harsh or cross word. On phone, regretfully, I've heard the occasional lapse but on CW never. Within that pristine and disciplined medium the chit-chat is replete with the milk of human kindness and an enormous reluctance to say goodbye. Whereas at the start of a contact this characteristic may not be apparent it soon becomes so, as one follows it through. Let me give a typical example, fictitious, of course, lest anyone thinks I'm getting at them!

I hear a CQ. Wondisi. Don't often hear anybody from that region. I reply. And Wondisi replies. Good. Another bit of rare DX for the log. Wondisi is brief and to the point, nothing lavish: TKS FER CALL = UR RST 579 = QTH UMDALA = NAME TONI = HW?

My reply is in a similar vein: 589, QTH SYDNEY NAME BOB. Toni replies: FB FB SOLID DR BOB OM. Dear Bob Old Man? A touch familiar to stern Australian ears but fairly common from some parts of the world. The French sometimes say Dear Bob Old Boy but I suspect it is

to give themselves moments of the utmost hilarity. Like Australians taking off the Poms. It is hilarious. Toni continues: RIG ERE 1 KW ES 3-EL BEAM = WX FINE 32C = HW DR BOB OM?

I trot through the same agenda rig, ant, and wx (I baulk at saying DR TONI OM) and then I play the QSL card play which is a polite way of saying I can't think of anything else to say. Back comes Toni: R R DR BOB OM = SURE QSL FB FB = HW UR FAMILY?

Ah! For some peoples talk of family is *de rigueur*. In parts of Asia it is rare to get down to the nitty gritty without a full and frank disclosure of family. It provides an opportunity for parents to bemoan the trials and tribulations of bringing up their children or to bask in the reflected glory of their achievements. Toni doubtless has been fretting to get to the topic because not to do so would be, for him, the height of discourtesy. So I rattle back appropriate details including grandchildren and Toni replies: FB FB DR BOB OM = HVE 5 WIFES 5 WIFES 10 BOYS 10 BOYS 8 GIRLS 8 GIRLS = U CUM UMDALA ES MKE QSO DR BOB OM = HW?

I reply with proper praise and avoid the more earthy response of FB SOLID OM HI and then say that since I am an OT I must QRT soon so that I can go to bed/dinner/out, whichever excuse seems appropriate, and I

conclude with 73s to TONI and his family and I hope to see him again and good luck and good DX and sure I'll QSL and even as I do so I realise that it would be unthinkable for me to say anything less because not to do so would be terribly rude.

For good measure I even add VA though VA no longer seems to mean what it used to mean: *I am ceasing transmitting*. Today it's more like: *He seems to be more or less at the end of our chat but if you want to carry on then go for your life because I've got all night*.

Toni is well versed and doesn't miss a beat. OK OK BOB DR OM ES VY GLD MEET U ES SURE U CUM UMDALA ES QSO WID FAMILY ES WIFES ES NW 73 73 ES SURE QSL ES CUAGN GD DX DR BOB OM GN GB E E.

To which I make a suitable reply but stop short of reciprocating the invitation because accommodation is limited and I can scarcely remember the name of my own family let alone one with 18 children and 5 wives. So I sign gently off and VA for the second time.

Unabashed Toni chimes back: FB BOB DR OM ES TKS FER FB QSO ES WEN U CUM UMDALA FB WELCOME 73 ES CUAGN ES GD DX GN GB AR E E. To which I reply E E and Toni EE's and then, without batting an eyelid he bursts into full-fledged CQ song and he's away again.

I glance at the clock and realise I've been nattering for 32 minutes. I enter the log and then quietly creep along the band hoping to have one of those quick, simple and unencumbered contacts where RST, name and QTH are exchanged and that's the lot. Courtesy is lively but it does take time!

*21 Wallumetta Rd Newport NSW 2106

ar

Repeaters — additions, deletions, alterations. Have you advised the WIA Of changes needed to the Repeater List?

■ Technical

Another Tip for Using the Noise Bridge

Lloyd Butler VK5BR* describes a method of achieving higher resistance resolution with the usual type of noise bridge.

Bridge Configuration

The elements of the RF bridge are a signal source, a balancing network and a signal detector. The usual form of bridge utilizes a signal source which is set to frequency of measurement. This form of bridge operates with an untuned detector which, in effect, is a broadband circuit (refer Fig 1).

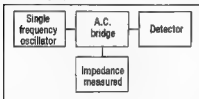


Figure 1 — Conventional form of RF bridge.

The noise bridge, used in amateur radio to measure the impedance components of antenna circuits, reverses the arrangement. The signal source is broadband or untuned and the frequency of measurement is set by a tuned detector, normally the radio shack receiver (refer Fig 2). This simplifies the equipment as the signal source is provided by a simple noise generating circuit and a built in detector is not required.

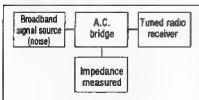


Figure 2 — Noise bridge.

Use of Single Frequency Source

In general the noise bridge balances with a sharp null to give defined readings of resistance and

reactance on the respective dials. However, I have found that for certain combinations of the two components, the resistance null can be very broad making it difficult to decide on the precise value of resistance component. I have noticed this effect, in particular, when the measurement unknown has dominant inductive reactance and the resistance component is small.

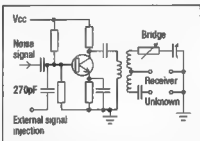


Figure 3 — Modification to noise bridge for external signal.

The resistance balance resolution can be sharpened up by substituting a single frequency signal source for the noise signal (in effect, reverting to the configuration of Figure 1). In my own bridge, I have fitted an external terminal pin connected via a capacitor into the base of the last amplifier transistor which couples the noise signal into the bridge network (refer Fig 3). Connecting my test bench signal generator into the terminal feeds its signal into the bridge network. The signal level from the generator is set high enough to override the noise source. For a receiver operated in the SSB or CW mode, an unmodulated signal is used to produce a beat note at the receiver audio output. The bridge is adjusted for a null in that output or a minimum reading of the S meter (if fitted). If the signal generator has amplitude modulation of tone, this can also be

used with the receiver set for AM mode

I have not attempted to examine too deeply the reasons for the improved resolution but I suspect it is related to the significant receiver bandwidth. Receivers used for AM and SSB have a bandwidth of at least several kilohertz. Basically, the noise bridge network is a capacitance balancing circuit not critically affected by frequency when measuring fixed capacitance. However, when inductance is measured, the inductive reactance is subtracted from an internal capacitive reactance and the resultant capacitive component is frequency dependent. Furthermore, if the measured impedance is an antenna system, its components will be frequency dependent regardless of whether it looks capacitive or inductive. Considering these factors, one can well imagine the bridge having better resolution when operating at a single frequency than when operating with a signal spread over several kilohertz as defined by the receiver bandwidth.

For a receiver equipped with a narrow band crystal filter, one might consider switching in the filter as an alternative means to restrict the bandwidth and hence improve resolution of the bridge measurement. I haven't had a suitable receiver to experiment with this but I can anticipate one possible problem. Signal power detected in the receiver from the noise source is directly proportional to the receiver bandwidth and the narrowed bandwidth might reduce the noise source level too much for fine adjustment near the balance point of the bridge. This could defeat the initial objective in improving resolution. There is no such problem in using the single frequency signal source as signal power of the single frequency is not affected by bandwidth

This simple modification, to allow external signal injection, is well worth while. I have made use of it many times when the adjustment null, using the noise source, was not well defined. The single frequency source often sharpens up resolution of the null very nicely

*18 Ottawa Avenue Panorama SA 5401

ALARA

Sally Grattidge VK4SHE*, ALARA Publicity Officer

First, a reminder to all those YLs who have been asked to tell their stories for the history being compiled by Federal Historian, John Edmonds. Please do not leave this in the "too hard" basket for too long. You don't have to create a literary masterpiece, just a short friendly letter telling something of what it was like being a woman in amateur radio in the early days.

Only three replies from VK4 so far (results in the other states unknown), so come on ladies, do it now, before you are up to your ears in Christmas cards.

It is nice to hear two new calls on the Monday night net. Welcome to Elaine VK4MEM, secretary of Gympie ARC and zucchini grower, and Diane VK4MFP from Logan City in the Brisbane area.

Summer is here with the usual increase in noise on 80 metres, so just a reminder that there are two Queensland nets for YLs in that state who have difficulty hearing the Southerners on Monday nights. The VK4 YL net originates in Townsville on Friday nights at 0930 UTC, somewhere near 3575 kHz, and the DRL (D strict Radio Ladies) comes from Rockhampton every second Thursday at 1100 UTC, also near 3575 kHz.

Christine VK5CTY visited her family in Melbourne recently, but also met with some other ladies. She spent a day with Bron VK3DYF and Gwen VK3DYL discussing ALARA matters, as well as enjoying their company.

Christine and her OM Geoff VK5TY had afternoon tea with Valda VK3DVT and Marlene VK3EQO (ex VK5QO), and then called in on Mary VK5AMD on their way through Bordertown. At Murray Bridge they shared an unexpected meal with Meg VK5AOV and her OM David VK5OV, before completing their trip in time to join in the ALARA Monday night net.

Margaret VK4AOE and OM Ervon are trying to grow Bully Beans (they sound a bit mean, but apparently sheep like them). The precious irrigation water disappears down huge cracks in the parched ground, and Margaret wonders if someone on the other side of the world is getting wet!

JOTA

Sally VK4SHE and Bob VK4AAH manned one of seven JOTA stations in the Townsville area with about fifty Brownies, Guides, Cubs and Scouts at the Wulguru Scout Den. Bob picked up some DX on 15 metres, and it was discovered that you can't work 14 MHz with Packet in the next room. Propagation to the Sydney area was especially good on 14 MHz.

Most of the participants were Cubs and Brownies and, as it is quite exhausting concentrating on every word so that you can pounce every time someone says "I don't know what to say", the operators were happy to close down at ten o'clock and go to bed.

There were some amusing moments, like when an entire group in New South Wales sang "Happy Birthday" for one of the Cubs. In an effort to get away from one word overs SHE whispered to one young operator "Ask them what activities they are doing" This produced a good North Queensland "What are you doing?" and the answer "Talking to you on the radio."

VK4WIC was the callsign used by Neil VK4NF and Margaret VK4AOE during the JOTA operations with Dalby Yumborra Cubs, Brownies and Joeys, as well as the Dalby Guides. They commenced about 0400z using 40 m, 80 m and 2 m. Packet was also running but, unfortunately, there did not seem to be anyone operating that mode. QRN was evident during the afternoon which spoiled otherwise good signals, but they managed to enjoy contacts with VK4s and VK2s as well as ZL2AS.

Some of the young people handled their contacts like veterans. Joeys experiencing their first JOTA were all willing to take the mike, though tiny voices did not transmit very well and the little

fellow who nodded in reply to a query was not heard till he was persuaded to say "yes" instead of the nod.

Julie VK4JJB operated on the Saturday for Bundaberg West Cubs and had visiting groups. She had eighteen boys and three girls. On Sunday she went to help with the main group Elaine VK4MEM was part of JOTA in Gympie and operated mainly on 2 m.

District Radio Ladies participated in JOTA in the Rockhampton area with Guides and Brownies. Robyn VK4RL, Rob VK4SEA, Mary VK4PZ and Gordon VK4GM set up and operated until 11.45 pm on Saturday (Robyn turns into a pumpkin at midnight — at least that's what she told the kids, anyway!). Lorna and Ted VK4QI joined in for a few hours. Packet was flavour of the day — they could not keep the kids off the keyboard. No problems getting anyone to talk and contacts were enjoyed on HF and 2 m. The Guides were examined for their Radio badges and all passed.

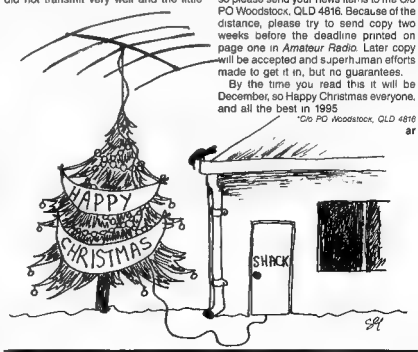
Pat VK3OZ did not work JOTA this year but received a call on 2 m during the evening from a local JOTA station who had a Scout Leader looking for a CW contact. They were able to have a QSO on 80 m, transferring to 15 m when 80 was found to be too noisy at the JOTA QTH. The QSO was enjoyed by Pat and the Leader, who was not an Amateur and knew very little about Amateur procedure. This was Pat's first CW JOTA contact in three years involvement.

I am now the ALARA Publicity officer, so please send your news items to me C/o PO Woodstock, QLD 4816. Because of the distance, please try to send copy two weeks before the deadline printed on page one in *Amateur Radio*. Later copy will be accepted and superhuman efforts made to get it in, but no guarantees.

By the time you read this it will be December, so Happy Christmas everyone and all the best in 1995.

*C/o PO Woodstock, QLD 4816

ar



AMSAT Australia

Bill Magnusson VK3JT*

National co-ordinator

Graham Ratcliff VK5AGR
Packet: VK5AGR@VK5WI

AMSAT Australia net:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7064 MHz. (usually during summer).

Secondary 3.685 MHz. (usually during winter).

Frequencies +/- 5 kHz for QRM.
AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia. addressed as follows:

AMSAT Australia
GPO Box 2141
Adelaide SA 5001

called INFORMATOR-1. It is unclear at the time of writing whether the fault lies in the AO-21 package or in the larger system. The INFORMATOR-1 satellite had come to the end of its mission and attitude and thermal control had been suspended by the control station about a month ago. The amateur package had, however, been left switched on. DB2OS is investigating the position but it appears unlikely that we will hear AO-21 again.

This amateur radio package had become very popular among those equipped with only the most modest of gear. The down link signal was always very strong and at times stations using only a vertical antenna could be heard working through the FM repeater. Recently AO-21 had added a WXSat image to the down link telemetry cycle. I have severe noise problems on two metre receive so I never bothered to try to decode this signal but I'd certainly like to hear from anyone who was successful. The FM down link also carried good will messages from time to time. The last one commemorated the anniversary of the first moon landing by playing Glenn's "Small step for man" tape. This was operational until shortly before the untimely demise of AO-21.

Home-brewers Report

I have received a number of replies on the subject of home brewing of satellite related equipment. It seems that this aspect of our hobby is alive and well. Dick VK3ABK is putting together what is shaping up to be a fine satellite station. He is building G3RUH type modems and decoders. The antenna system is taking shape with crossed Yagis on 2 m and 70 cm on an azel mount with pre-amps at the feed point. Dick is obviously serious

about this satellite business. He is pressing into service some older type gear including a Yaesu FV-102 VFO and an IC-202 transmitter. Dick's approach is to do things properly but as cheaply as possible. So far the list of home brewers includes Dick VK3ABK, Bob VK3BNC, Ron VK6TF, Max VK3LMT and Mike VK3KYW. More of their exploits later.

Congratulations guys. More news on this front would be great. The initial response was unexpectedly high. Maybe we are not developing into a "plug and play" group after all.

Digital Comms on Phase 3D

It's gradually becoming clearer that we can expect some rather spectacular goodies when phase 3D is operational. Lyle Johnson WA7GXD of the RUDAK-U development team recently reported on the progress of the digital comms package for phase 3D. It seems they are planning for as many as 10 channels operating simultaneously. There is also the possibility of, wait for it, a 256 kilobit/sec modem on board. This data rate would support real time motion video! RUDAK will be the prime comms path for the earth imaging cameras and will also be connected to the GPS, Global Positioning Satellite experiment.

The RUDAK system will use two computers, one based on an NEC V53 processor and the other on an Intel 386EX. They will each have 16 megabytes of error corrected memory. By comparison the microsats have 256 kilobytes of memory. The projected 10 year lifetime of phase 3D means that the designers have somehow had to ensure that tomorrow's users are not held back by today's technology. The "average user" will not be forgotten. Phase 3D's RUDAK will have a 1200 bps modem, a 9600 bps modem switchable to 19.2 kbps and maybe 38.4 kbps. Two DSP units, good for about 56 kbps, will complete the impressive line up.

Sunday Night Net

Please note that for the remainder of the summer daylight saving period the Sunday night net will be conducted at 0900 UTC with early check-ins at approximately 0845 UTC. The frequency for this period will be 7.068 MHz +/- QRM.

AO-21 Falls

On Monday 17 October DB2OS reported what looks like the demise of OSCAR 21. AO-21 was an amateur payload on board a large Russian satellite

ATN ANTENNAS P/L

A C N 062 557 644

Ask for a free catalogue

We manufacture a comprehensive range of HF, VHF and UHF antennas, baluns, power dividers etc. Log periodicals provide continuous coverage from 13-30MHz (incl WARC) and replace outdated tri-banders.

Now in use in 42 overseas countries. Mono bands 7 MHz + up. 10-30 MHz & 7-30 MHz extra heavy duty now available.

- Rotators by Create, coax cables & phillystran guy/halyard materials
- B&W all frequencies 1.8-30MHz end fed vee.
- All frequencies 3.5-30MHz folded dipole. 10W, 100W, 1kW. No radials required.
- Hard-drawn copper antenna wire and insulators.
- Diamond 80-40 & 80-10 dipoles and accessories.

56 Campbell St, Birchlip Vic 3483

Phone: (054) 92 2224

Fax: (054) 92 2666.



- High gain VHF & UHF amateur, scanning & TV antennas
- Butt section triangular aluminum towers for fixed or tilt-over applications.
- Selections of power chips and TX. Also Hazer tubes
- VSWR/PWR meters by Diamond to 1300MHz 10 models All in stock.

Dish Feeds for 2.4 GHz and "S" Mode

An excellent article on this subject appeared in the Sep/Oct '94 edition of *Amsat-NA's Journal*. It is written by Ed Krome KA9LNV. Ed has a good practical approach to this subject and the article is easy to read even for first timers. He takes the reader through the fundamentals of dish design and then develops these ideas further into dish feed requirements. I've contacted Ed with a view to using parts of the article in this column.

The move to "S" mode is not as hard as many believe and once you get over that initial fear of microwaves it's fairly plain sailing. The old problem of "re-inventing the wheel" is still a possibility. Most of the texts available seem to presuppose a certain amount of experience. For this reason Ed's article is most welcome. I look forward to relating some of his thoughts in this column in coming months.

News from VK5ESC (Equipment Supplies Committee)

In the *Amsat-VK* newsletter No 115, Graham reported a new high performance kit from the VK5 Equipment Supplies Committee. It is a 2401 MHz receive converter for "S" mode use. This will fill a gap in the market. The only alternatives appear to be to roll your own from scratch, a mighty task requiring lots of experience, or purchase something from overseas. There are a number of amateur suppliers in the States and Europe dealing in this sort of gear and it will be interesting to see how the VK5 converter stacks up against the competition. The new design uses a teflon PCB and an MGF1302 GaAsFET followed by MMICs. It has the usual 145 MHz output for use into any two metre amateur all mode receiver and offers the choice of two local oscillator designs.

I'd like to hear from anyone who has completed this converter, particularly if they could give an idea of how it compares with the older design and maybe how it lines up in comparison to the imported devices. We are really indebted to the VK5 ESC guys for the excellent efforts they have put in over recent years to get a lot of people on the air on satellites and VHF/UHF. Building your own can be a daunting task on these bands. As well as an array of kits they have a good stock of odd components that may prove difficult to source otherwise. You can obtain their catalogue by writing to them at PO Box 789, Salisbury, SA 5108, SASE, please.

*359 Williamstown Rd, Yarraville VIC 3013
Packet VK3JT/VK3BBS

AWARDS

John Kelleher VK3DP — Federal Awards Manager*

The very best of Christmas cheer to all. Another year has passed with only praise from me for those who have participated in the Awards program. In the main, I think I have got it right for 99 percent of the contributors. The other one percent have sent me applications for certificates and upgrades (very nice applications, mind you), but they have left off identifying the country they have claimed for various call signs now long extinct although they still apparently qualify for some unknown DXCC country. Maybe, if you were to follow this simple rule, I may not become "confused", as another well known amateur put it.

This month, after several requests for its publication, I will begin with the CQ WPX (World Prefixes) program.

CQ WPX Award

The CQ WPX Award recognises the accomplishments of confirmed QSOs with the many prefixes used by amateurs throughout the world. Separate distinctively marked certificates are available for two-way SSB, CW and mixed modes. All applications for WPX certificates must be submitted on the official application form CQ 1051A. This form can be obtained by sending a four by nine inch SAE to the WPX Award Manager, Norm Koch K6ZDL, PO Box 880, CR-13, Clovis NM 88101, USA.

All QSOs must be made from the same country. All call letters must be in strictly alphabetical order, and the entire call letters must be shown. All entries must be clearly legible. Cross-mode contacts are not valid for CW or two x SSB certificates.

Certificates are issued for the following modes and number of prefixes: Mixed (any mode) — 400 prefixes; CW and SSB — 300 prefixes. Separate applications are required for each mode. Cards need not be sent, but they must be in the possession of the applicant. Any and all cards may be requested by the WPX Award Manager or by the CQ DX committee. The fee for each certificate is \$US4.00 for CQ magazine subscribers (with recent mailing label) or \$US10.00 for non-subscribers.

Prefixes

The two or three letter/numeral combination which forms the first part of any amateur call will be considered the prefix. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. The following would be considered different: W2, WA2, WB2, WN2, WV2, K2, KA2, KB2, etc.

Any prefix will be considered legitimate if its use was licensed or permitted by the governing authority in that country after 15 November 1945.

WPX Honour Roll

This certificate recognises those operators and stations that maintain a high standing in confirmed, current prefixes. The rules, therefore, reflect the belief that Honour Roll membership should be accessible to all active amateurs, and not be unduly advantageous to the "old timers". A minimum of 600 prefixes is required to be eligible for the Honour Roll. Special issue prefixes will be considered current for as long as they are assigned to a particular country, and deducted as credit for Honour Roll standings one year after cessation of their use or assignment. It follows, therefore, that Honour Roll standings may have to be updated annually.

VERON Jubilee Award

The Dutch amateur radio society VERON celebrates its 50th anniversary in 1995. During this jubilee year, beginning 1 January 1995, they are issuing the VERON Jubilee Award.

This award can be applied for by all licensed radio amateurs who are able to establish contact with at least 100 stations in the Netherlands during the entire year of 1995. SWLs may also apply for the award. All bands and modes can be used. No QSL cards and no fees are required.

If you wish to apply for the award, send an extract of your log to the Award Manager, Sytse Wybenga, Certificate Manager VERON, Pr Bernardlaan 60, 8501 JG Joure, The Netherlands. Applications close in March 1996.

Worked Republic of India Award

The Amateur Radio Society of India presents the revised rules for the "Worked Republic of India" award.

1. Available for QSOs (CW, AM, SSB and RTTY) on any HF band (160 to 10 m, including WARC bands) with stations in mainland India, the Lakshadweep (Laccadives) and the Andaman and Nicobar Islands, on or after 26 January 1990.
2. Original QSL cards, or log extracts, duly certified by an office bearer of the country's IARU-Recognised Member society, should be submitted to the Awards Manager. An accompanying

DICK SMITH ELECTRONICS



Don't Go Without A Yaesu Mobile Transceiver!

Whether you're going bush or operating around town, a quality mobile transceiver from Yaesu delivers the best performance.

FT-2400H Rugged 2m Transceiver

The ultimate in dependability and reliability! The FT-2400H is built using commercial grade mechanical and electronic construction techniques and meets the tough USA MIL-STD-810C shock and vibration requirements, so you know you're getting the highest quality. A one-piece die-cast chassis/heatsink allows three-step output of up to 50 watts without forced air cooling. Plus, fiberglass circuit boards and chip components provide professional-grade reliability. It has a large backlit LCD screen, backlit knobs and 31 tuneable memories (which can store frequency and a four-character name of your choice). A customised microprocessor also provides Auto Repeater Shift to suit Australian conditions. Two-stage track-tuning and a dual FET mixer improve receiver intermod performance. Scanning functions include programmable scan limits, selectable scan resume modes, memory skip and priority monitoring. Seven selectable channel-steps and CTCSS encode are standard features. Comes complete with MH-26 hand mic., mobile mounting bracket and DC power lead.

Cat D-3630

2 Year Warranty

\$699

Specifications

General
Frequency range Transmit 144-148 MHz
Receive 140-174MHz
Channel steps 5, 10, 12.5, 15, 20, 25 & 50kHz
Current Consumption Receive 400mA
Transmit 12 Amp (Hi power)
Dimensions 160 x 50 x 180mm (w/o knobs)

Receiver
Intermediate Freq. 21.4MHz & 455kHz
Image Rejection Better than 70dB
Maximum AF Output 2.0 watts into 8 ohms @ 10% THD

Transmitter
RF Output power: 50/25/5 watts (Hi/Med/Low)



\$699

2 Year Warranty



FT-2200 Compact 2m Transceiver

The new FT-2200 is a compact, fully featured 2m FM transceiver providing selectable power output of 5, 25 and 50 watts, and includes the latest convenience features for more enjoyable mobile or base station operation. Built around a solid diecast chassis, it provides 49 tuneable memories, a large variety of scanning modes, an instant recall CALL channel, 7 user-selectable channel steps from 5kHz to 50kHz and is just 140 x 40 x 160mm (not including knobs). Backlighting of the large LCD screen, knobs and major buttons is even automatically controlled to suit ambient light conditions.

Also provided is a 38 tone CTCSS encoder, DTMF based paging and selective calling with Auto-Page/Forwarding features, and 10 DTMF auto-dial memories. The LCD screen provides a highly legible bargraph Signal/P.O. meter plus indicators for the various paging and repeater modes. An optional internal DVS-3 digital recording/playback board can also be controlled from the front panel, giving even greater messaging flexibility. Supplied with an MH-26DB hand microphone, mobile mounting bracket and DC power lead.

Cat D-3635

SAVE \$300!

A deluxe 2m/70cm dual-band hand-held transceiver offering easier operation and more features than ever before, and now at an unbelievably low price! The FT-530 provides a flexible dual receiver facility with separate volume and squelch controls, allowing you to listen on two frequencies in the same band, or one frequency on both bands! Plus, the exclusive Australian version features full 70cm band coverage (420-450MHz), selectable Auto Repeater Shift on both 2m and 70cm (suits Australian band plan), and extended receiver coverage as standard. Two VFOs and 41 tunable memories per band are provided, together with keypad or dial frequency entry, seven tuning steps and a one-touch CALL channel. The dual 5.5-digit LCD screen includes many functional indicators plus separate signal/P.O. bargraphs for both receivers. An LCD voltmeter function is provided so you can even monitor your battery's performance under load and estimate remaining battery life.

Other top features include: Inbuilt dual CTCSS encode/decode, CTCSS scanning, an auto battery saver (ABS) for extended battery charge life, a cross-band repeater facility and inbuilt clock with alarm and snooze functions. Also provided is VOX circuitry for use with the optional YH-2 headset, a user replaceable lithium back-up battery, and DTMF selective calling and paging. A DC supply jack allows transceiver powering and NiCad charging, with RF output in four steps up to 5W at 12V. The FT-530 comes complete with a high-capacity 1000mAh NiCad battery, antenna, belt-clip, carry case and approved AC charger. Cat D-3620

Specifications

Frequency range

Transmit 144-148MHz, 420-450MHz
Receive 130-174MHz, 420-500MHz,
800-950MHz

Current Consumption:

Auto power off 150uA
Standby (saver on) 16.8mA (both bands)

Dimensions: 55(W) x 163 (H) x 35mm(D)

Transmitter:

Power Output: 5, 3, 1.5, 0.5 (at 12V)
RF Power Output 2.0W (2m), 1.5W (70cm)
(Supplied 7.2V 1000mAh NiCad)

Receiver:

Sensitivity: 2m: <0.15uV, 70cm: <0.18uV
(Ham bands only, 12dB SINAD)
Audio Output 300mW at 8 ohms (at 12V)



SAVE \$300

Hurry,

**This incredibly low price is only valid until
31st December 1994, or while stocks last.**

Customers who purchased an FT-530 between 15/8/94 and 30/9/94 as part of our previous promotion should have received bonus gift vouchers to cover their purchase. Please contact the store where you purchased your FT-530 if you have not received your Gift Vouchers.

2 year warranty

\$699

End Of Year Specials!



Grab a Christmas bargain while stocks last. Prices are valid until 31st December 1994, and some items have only limited stock available. Some units may be shop soiled, but full warranties apply.

1. Revex HF/6m W502 SWR/PWR meter, made in Japan, with accurate P.E.P. metering
Cat. D-1360 **\$179 SAVE \$20**
2. Yaesu FT-26 2m handheld, with 700mA/H NiCad, carry case, extended receive, 2 year warranty.
Cat. D-3600 **\$399 SAVE \$70**
3. Yaesu FT-415 deluxe 2m handheld, with 1000mA/H NiCad, carry case, extended receive and many more features.
CLEARANCE Cat. D-3610 **\$499 SAVE \$30**
4. Yaesu FT-815 deluxe 70cm handheld, with 1000mA/H NiCad, carry case, 430-450MHz coverage, 2 year warranty
CLEARANCE Cat. D-3615 **\$499 SAVE \$200**
5. Yaesu MH-12A2B standard speaker/mic.
Cat. D-2115 **\$59.95 SAVE \$10**
6. Yaesu MH-18A2B mini speaker/mic.
Cat. D-2117 **\$49.95 SAVE \$10**
7. Digitor 2m RF amplifier, 0.5 to 5w input, up to 30w output, GaAs Fet receive pre-amp, large heatsink
Cat. D-2510 **\$139.95 SAVE \$30**
8. Mastercharger intelligent fast charger suit handhelds, complete with cigarette lighter lead. Suits most Yaesu handhelds, optional adaptors for other models/brands.
Cat. D-3850 **\$159.95 SAVE \$10**
9. Yaesu FT-712R 70cm mobile transceiver, 35w FM output, 430-450MHz coverage, hand microphone, 2 year warranty Cat. D-3330 **\$599 SAVE \$150**
10. Yaesu FT-5200 deluxe 2m/70cm mobile transceiver, 50w output on 2m, 35w output on 70cm, 32 memories, 2 year warranty
Cat. D-3310 **\$1399 SAVE \$100**
11. Revex W540 VHF/UHF SWR/PWR meter, made in Japan, covers 140-525MHz.
Cat. D-1370 **\$179 SAVE \$20**
12. Yaesu FT-840 H.F. mobile transceiver, 2 year warranty, with hand microphone.
Cat. D-3275 **\$1695 SAVE \$200**
13. Yaesu FT-890 deluxe HF mobile transceiver, 160m-10m, extended receive, all mode (SSB,CW,AM,FM), RF speech processor.
Cat. D-3270 **\$1995 SAVE \$300**
14. Yaesu FT-990 HF base station transceiver, in-built auto antenna tuner and AC power supply, RF speech processor, DDS, digital audio filtering, IF shift and IF Notch, 500Hz CW filter standard. Ex-demo units only at this price!
Cat. D-3260 **\$3295 SAVE \$700**
15. Yaesu FL-7000 1.2kW HF linear amplifier, in-built high-power auto antenna tuner and AC power supply. Ex-demo units only.
Cat. D-2549 **\$2995 SAVE \$1300**
16. Yaesu SP-5 large desk speaker with audio filters
Cat. D-3230 **\$199 SAVE \$50**
17. Yaesu NC-15 desktop charger, for parts use only.
Cat. D-3511 **\$2.95**

LIMITED STOCKS

PHONE, FAX & MAILORDER SERVICE & YAESU BROCHURE HOTLINE
Outside Sydney (FREE Call) 008 22 6610
Sydney and Enquiries - (02) 888 2105
 Fax: (02) 805 1886 or write to
 Dick Smith Electronics, Mail Orders, Reply Paid 160
 PO Box 321 NORTH RYDE NSW 2113
 All major Credit Cards accepted. O/Nite Courier Available.
 Yaesu stocks and some antennas not held at all stores, please
 contact your local store for availability, or phone 008 22 6610



DICK SMITH

ELECTRONICS

NSW - Albany 21 8399 • Bankstown Square 707 8888 • Blacktown 671 7722 • Brookvale 905 0441 • Bondi 387 1444 • Campbelltown 27 2199 • Chatswood Chase 411 1955 • Chullora 842 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6633 • Hurstville 500 8622 • Kogarah 56 2092 • Liverpool 800 9688 • Marandah 33 7886 • Miranda 825 2722 • Newcastle 61 1896 • North Ryde 878 3855 • North Sydney (Greenwood Plaza) 964 9467 • Orange 618 400 • Parramatta 689 2188 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Wollongong 28 3800 ACT • Belconnen (06) 253 1785 • Fyshwick 280 4944 VIC • Ballarat 31 5433 • Bendigo 43 0388 • Box Hill 890 0699 • Colong 363 4455 • Dandenong 794 9377 • East Brighton 592 2366 • Essendon 379 7444 • Frankston 783 9144 • Geelong 232 7111 • Highpoint 318 6090 • Melbourne City 399 Elizabeth St 326 8088 • 246 Bourke St 639 0396 • Richmond 429 1614 • Ringwood 879 5388 • Springvale 547 0522 T.B.B. • Albury 356 3733 • Boroivale 282 6200 • Brisbane City 229 9377 • Buranda 391 6233 • Cairns 311 515 • Capalaba 245 2870 • Cherridale 359 6555 • Maroochydore 791 800 • Rockhampton 27 5644 • Southport 32 9033 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 SA • Adelaide City 232 1200 • Elizabeth 255 6099 • Enfield 260 6088 • St Marys 277 8577 • Westmeads 235 1244 WA • Carnington 451 8666 • Fremantle 335 9733 • Perth City 481 3281 • Midland 250 1460 • Northbridge 328 6944 TAS • Hobart 31 0800 • Launceston 344 556 NT • Darwin 81 1977

NEW STORE OPENS DECEMBER: 272 MOGGILL RD, INDOOROOPILLY, QLD

MAJOR AMATEUR STOCKIST STORES SHOWN IN RED

letter should clearly indicate the award desired

3. Contacts with the same Indian station on different bands will count for points, but both stations must be fixed. Contact with, or from portable, maritime or aeronautical mobile stations are not eligible
4. A minimum of 100 points should be earned to qualify for the award as per the table below, showing the number of points per QSO
5. The fee for the award is five IRCs. If original cards are sent, additional IRCs should be included to cover return postage.

Points Table

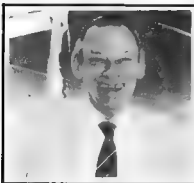
Band	Mainland Stations VU2 VU3 Sp Pfx	Stations in VU4 & VU7
160	3 pts	4 pts
80	2 pts	3 pts
40	2 pts	3 pts
20	1 pt	2 pts
10	1 pt	2 pts

Special prefixes such as VU9, VU25, VU40, AT0, etc must be clearly indicated on the QSL card.

The decision of the Awards Manager will be final and binding in all cases. Applications should be sent to Vice President and Awards Manager, Amateur Radio Society of India, 40 Ghalib Apts, Parwana Road, Pitampura, Delhi 110 034, India.

Ken Stevens VK3QW

Lastly, but importantly, allow me to introduce another member of the WIA DXCC Honour Roll, who is also a licensed radio bookmaker in South Australia. In his own words, Ken Stevens VK3QW has enjoyed the DXCC challenge, saying that long hours and plenty of patience made him a lot of wonderful friends. Ken is also interested in working US counties, which total 3067, so he has his work cut out for him.



Ken Stevens VK3QW, a member of the WIA DXCC Honour Roll.

*PO Box 2175 Caulfield Junction 3181
ar

Club Corner

Darwin Amateur Radio Club Cyclone Tracy Commemorative Event Station

The Darwin Amateur Radio Club (DARC) will be activating a special event station from 18 to 31 December 1994 as a 20th year commemorative recognising the devastation of Darwin on 25 December 1974 and the amateur radio involvement in the aftermath.

It is hoped to get the special event callign V18TRACY, but this has not been confirmed as yet by the SMA.

Operating frequencies of this special event station will be as follows:

Phone	CW
3618 kHz	3530 kHz
7065 kHz	7009 kHz
14175 kHz	14009 kHz
21175 kHz	21130 kHz

Mark Sellers VK0MS

Eastern and Mountain District Radio Club Exams

The EMDRC has reinstated a quarterly examination schedule for all licence classes. Exams will be scheduled in February, May, August and November of each year. SWLs or persons wishing to upgrade their licence are invited to contact the Club's Examination Manager, Geoff Atkinson VK3YFA on (03) 876 4850.

EMDRC to go to the moon

A number of club members have recently been involved in the construction of two DL6WU 15 element antennas for Moonbounce on two metres. At press time preparations were being made to test the array on VE3QNT. Our aim is to enter the International EME competition in 1995. Interested? Contact Christopher Platt, VK3KCP on (03) 629 2653.

Packet Kits

EMDRC has arranged for the supply of a high quality PCB and components to build the Baycom Packet Modem described in the July, 1993 issue of *Amateur Radio*. The kit will be available at the initial price of \$50.00. Contact Chris Travers VK3XGT on (03) 723 7126 to obtain your kit.

February Guest Speaker — John Day on Packet

The guest speaker for the February Meeting will be John Day VK3ZJF from Daycom who will talk about and demonstrate Packet Radio. The last

presentation by John on this subject resulted in a full house, so be early! The meeting will be held at the Nunawading Council Offices, Maroondah Highway, Nunawading at 8.00 p.m. on Friday, 3 February, 1995

Christopher Platt VK3KCP

Radio Amateurs Old Timers Club (RAOTC)

Members are reminded that there will not be a broadcast in January. Broadcasts on 6 February and 6 March 1995 will be at the same time as in November 1994

Members having problems with reception of our 40 metre transmissions are reminded that there is a simultaneous transmission on 3.650 MHz.

Ivan Hodder, ex VK3RH

I would appreciate hearing from anyone who can give me Ivan's current address as I have some information which would be of great interest to him.

Allen Doble VK3AMD

A. J & J COMAN ANTENNAS

Dual band Co/linear 2M&70cm	\$ 95
2M co/linear 2 5/8	\$ 93
12 ele 2M	\$123
6 M J-pole	\$109
6 M co/lin 8 dbd rad 4.NEW	\$150
6 ele 6 M	\$196
Duo 10-15 M	\$265
3 ele 15 M	\$190
3 ele 20 M	\$298
20 m log-yag array 11.5 dbd	\$685
M B Vert NO TRAPS 10-80 M	\$255
Tri band beam HB 35 C 5 ele	\$675
40 M linear loaded 2 ele	\$484
13-30 M logperiodic 12 ele	
all stainless/steel fittings	\$885
70 cm beam 12 ele bal/Feed	\$102
23 cm slot fed 36 ele brass cons	
s/solder-assembled 18 dbd	\$170
80 m top load/cap/hat vert.	\$260
3 ele 40m V/cap hats 60mm boom	\$785
2 m 144 190 2.2 wavelength boom	\$145

PLUS FREIGHT

**BANKCARD MASTERCARD &
VISA ACCEPTED**

Call **ANDY COMAN VK3WH.**
**LOT 6 WEBSTERS ROAD,
CLARKFIELD 3429
PHONE 054 285 134**

DAYCOM

Australias Amateur Radio SUPERSTORE!
Summer 1995 Communications Products

The BEST for you in 1995 — from MFJ, Ameritron and a host of new names!

MFJ MFJ MFJ

NEW RTTY, ASCII, CW, AMTOR Decoder

MFJ MFJ

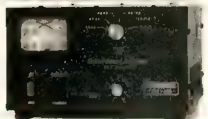
SWR analyser family grows!
 Gets Resistance meter as well.

AMERITRON

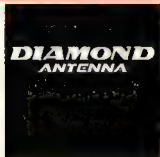
NEW Solid State HF Linear Amplifiers



NEW Voice Keyer voice memory unit



AND the new names are...



BUTTERNUT ELECTRONICS CO.

BUCKMASTER
hy-gain
by Telex
OPTOELECTRONICS

To bring you the best possible products at affordable prices is our aim. This year we bring you new products from well-known names and some new names with great products!
LOOK INSIDE - you won't regret it!

This catalogue, all illustrations herein and textual matter is Copyright ©1994 by Daycom Communications Pty. Ltd. All trade names and trade marks are the property of their respective owners and are used with permission. Information in this catalogue has been carefully checked and is believed to be correct however Daycom Communications will assume no liability for any errors or omissions contained herein. All prices, availability information and specifications are subject to change without notice. Please enquire for latest information.

DAYCOM

COMMUNICATIONS Pty. Ltd.

37A Fenton Street, Huntingdale
R.O. Box 206, Oakleigh, 3166

Bankcard, MasterCard
 & Visa all welcome

Phone (03)543-6444
 FAX (03)543-7238

SWR & Power meters

HF & VHF SWR Analysers



The MFJ SWR Analysers are designed for the ultimate in convenience when tuning antennas, checking amplifiers and isolating feed lines. They have a low level RF source, an SWR bridge and a fully automatic SWR calculating circuit that offers port and shoot convenience with excellent accuracy.

They cover all popular amateur and many commercial bands and can be powered by a 9V battery (not supplied) or an external 9-18V DC source.

MFJ207 1.8-30MHz	\$199
MFJ208 138-156MHz	\$199
MFJ209 1.8-170MHz	\$275
MFJ217 30-60MHz	\$199
MFJ218 150-170MHz	\$199
MFJ219 420-450MHz	\$225



MFJ249 SWR analyser

When the MFJ SWR Analysers were first introduced to Australia both Neil Dunne and Ron Fisher commented that it would be nice if they had a built-in frequency counter for accurately setting or reading the frequency. Well MFJ listened! Now MFJ has added a comp. ext. 150MHz counter into the SWR analyser. BUT then MFJ decided it should cover VHF as well so the MFJ249 covers 1.8-170MHz, without a break! Use it as a digital display for the internal signal source or as a frequency counter with 0.1, 1, 10 and 100 second gate times giving you 0.1Hz resolution!

Then MFJ said, well what about the serious HF guys who need to know the feedpoint impedance? Well the MFJ259 now gives you everything! SWR, resistance and a frequency counter all in one.



MFJ259 SWR analyser

Crossed needle SWR/Wattmeters

Don't risk your expensive 2m or 70cm rig by transmitting without knowing your SWR! Shows peak or average forward and reflected power with power ranges of 200 & 200 watts forward, 5 & 50 watts reflected. At a glance you can see SWR, so there's no more risky guessing! Illustrated large, two-cool meter makes reading easy. Back aluminium cabinet measures 184 x 114 x 90mm. Lamp uses 12 VDC (supplied external).

The MFJ-8158 has peak and average reading functions which let you monitor SWR, forward and reflected power. Peak or average power in 2 ranges, 200 & 2000 watts forward and 50 & 500 watts reflected, and SWR from 1:1 to 8:1. Covers 1.8 to 30 MHz. Accuracy is $\pm 10\%$ of full scale. Back aluminium cabinet measures 184 x 114 x 90mm. SO-239 connectors. Meter lamp uses 12 VDC (supplied external).



MFJ817 VHF/UHF SWR meter



MFJ815B HF SWR meter

VHF & HF SWR & Wattmeters



The MFJ812B covers the 2M amateur band, reading forward and reflected power in two ranges (30 or 300 watts). Also lets you read relative field strength from 1-170MHz or SWR from 20 metres through 2 metres.

MFJ812B

HT power meter



MFJ816

HT SWR meter



MFJ816 HF SWR & wattmeter lets you read forward and reflected power on two scales of 30 and 300W from 1.8-30MHz. Easy to read two colour meter scale, case size 114 x 57 x 75mm.

MFJ816

HT SWR meter



MFJ841

HT SWR meter

Measures power and SWR of 2M hand helds. Read SWR from 1:1 to 8:1 and power up to 5 watts. SO-239 connectors, 50 x 57 x 40mm.

MFJ841

HT SWR meter



The PM-330 is a terminating type power meter for use from 1.8-500MHz. Full scale 0.5W to 120W in three ranges.

- Frequency range 1.8-500MHz
- Impedance 50 Ω $\pm 2\%$
- VSWR < 1.15 at 500MHz
- Connector "N" female
- Size 190Wx105Hx230D

PM-330 Power meter

Digital readout 1.8-170MHz

Noise Bridge

The MFJ202B has long been recognised as one of the world's finest noise bridges. Boasting a hand calibrated resistance scale and an extended capacitance range of 5150pF and built-in range extender the MFJ202B covers the range from 1 to 100MHz with ease!

Works with any receiver or transceiver. Case size 108 x 108 x 50mm uses 9V battery (not supplied).



MFJ202B Noise bridge

Antenna Current Probe

The MFJ206 is designed to measure RF current without the need for direct connection. Determine the current distribution, RF radiation pattern and polarisation of antennas, transmission lines, guy wires, building cabling and enclosures. Check for transmission line radiation due to high SWR or poor balance of open wire lines.

Measures only 100 x 50 x 50mm, uses 9V battery (not supplied) or external DC source.



MFJ206 RF Current probe

Bandswitching Dip meter

Works just like a Grid Dip Oscillator but has a bandswitch and uses only one external coupling coil rather than one for each band. No coils to change, no sensitivity control and you can connect a counter to accurately measure the frequency. Great for workbench and antenna work, the MFJ203 covers 1.8-30MHz in five overlapping ranges.

MFJ203 DIP meter

Solid state dipper



This modern, solid state Dip Oscillator covers pretty much everything you can find for such a device. The DM-4061A covers the range 1.5 - 250MHz in 5 ranges, can function as a dip oscillator or an absorbent wavemeter, plus has 2kHz modulation for receiver testing. Uses a single 9V battery (supplied) or an external source of 9-12V (not supplied).

DM4061A Dip meter

Terminating Power Meter

High power wattmeters

The Mirage MP series wattmeters cover all amateur bands up to 1.3GHz. Remote coupling measuring.

- Peak or average reading
- No charts or graphs needed
- 5 year warranty
- Quality meter movement
- Operates on 9-13.8V DC

MR-MP1 1.8-30MHz 2W

MR-MP2 50-200MHz 1.5W

MR-MP3 420-450MHz 150W

MR-MP4 1.25-1.3GHz 100W



1.5kW Tapped inductor tuner



- Peak reading power and SWR meter with two ranges (200W & 2kW)
- Covers entire 1.8-30MHz range
- 6 position antenna switch for coax lines, random wire or balanced lines or external dummy load
- Super heavy duty balun wound with Teflon wire
- Compact 273W x 514H x 381D all metal case

MFJ962C 1.5kW tapped inductor \$520

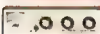
300W Deluxe tuner without dummy load



So you would like all of the features of the MFJ949E but don't want a dummy load? The MFJ948 is identical to the MFJ949E but has no dummy load!

MFJ948 Deluxe 300W, no dummy load \$292

Tuners for 2metres & 70cm



For mobile or base station operation choose the MFJ921 (two metres) or MFJ924 (70cm) for an efficient little tuner that will handle up to 300W PEP in a compact 203 x 64 x 75mm package.

MFJ921 2 metre tuner 300W \$154

MFJ924 70cm tuner 300W \$154

Tuner / Preselector for transceivers



The MFJ1040B helps you dig those weak signals out from the sludge which is not rejected by the front ends of some transceivers. This combination of a receiver preselector and a 300W rated tuner could be just the trick! Also has 20dB attenuator, handles two receivers, two antennas and has a automatic RF sensing bypass circuit. Covers 1.8-54MHz. Requires 12V DC.

MFJ1040B 300W tuner/preselector \$222

NEW MFJ Tuner + Artificial Ground

Throw up a random wire anywhere and work the world! Sounds great doesn't it, and the NEW MFJ934 combination tuner and artificial ground makes it possible. By putting the heart of an MFJ941E 300W antenna tuner with crossed needle SWR/power meter, and an MFJ931 artificial ground in one box you get everything you need for portable operation and you save money in the bargain!

When you don't need the artificial ground the MFJ934 functions as a normal tuner.



MFJ934 Ground & tuner combined \$365

3kW Differential 'T' tuner



- 3kW Differential-capacitor & roller inductor
- New, more accurate directional coupler
- Current mode balun reduces feedline radiation
- 6 position antenna switch
- Continuous coverage from 1.8-30MHz
- Wide spaced capacitor for true 3kW rating
- Compact 273W x 514H x 381D all metal case

MFJ986 3kW Differential 'T' \$652

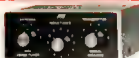
300W Deluxe tuner with dummy load



- Full 1.8-30MHz coverage
- Peak and average reading crossed needle SWR/Power meter (can be illuminated)
- Built in 300W dummy load
- 6 position antenna switch
- 4:1 balun for balanced lines or long wires
- Full 12 month warranty

MFJ949E Deluxe 300W with 'the lot' \$337

The smallest VersaTuner!



The smallest of the VersaTuner range. Size: 127 x 64 x 150mm. Power rating: 200W. Match: dipoles, vees, random wires, beams and mobile whips with either coax or balanced line feed from 1.8 to 30MHz.

MFJ901B 200W VersaTuner \$135

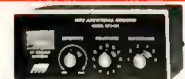
Long-wire tuner



This simple little tuner will allow you to operate just about anywhere with a random wire antenna. Matches high or low impedances, handles 200W PEP and is small enough to fit in your pocket 50 x 75 x 50mm.

MFJ16010 200W Long wire tuner \$93.90

MFJ931 Artificial Ground



Does your rig bite? Well, maybe it isn't hungry — it could just be that the ground connection you have is not adequate. A specialised tuner with an RF current meter, the MFJ931 can tune a piece of wire or an existing ground wire to place an RF earth right at the transceiver. Covers 1.8-30MHz, measures 190 x 89 x 178mm.

MFJ931 Ground system tuner \$176

3kW Deluxe tuner



- Widest matching range for lowest possible SWR!
- High-Q roller inductor positioned for best efficiency
- Extra heavy contact pressure for greatest reliability
- Covers entire 1.8-30MHz range
- 500:1 300W Dummy load built in
- 6 position antenna switch
- Compact 273W x 514H x 381D all metal case

MFJ989C 3kW Deluxe \$785

300W General purpose tuner



The MFJ941E covers the full 1.8-30MHz range, has front panel-mounted antenna switch, 12 position tapped inductor, 4:1 balun and sturdy metal case. Size: 267W x 73H x 178D.

MFJ941E 300W general purpose tuner \$247

300W Mobile tuner



The MFJ945D has a crossed needle SWR/power meter and is equally at home in the car, caravan, motor room, tent or your home station. Small size: 200W x 52H x 150D.

MFJ945D 300W mobile tuner \$198

QRP Portable antenna tuner



The MFJ971 tuner can be used at any frequency across the entire 1.8-30MHz HF spectrum. Rated at 200W this versatile little tuner matches the MFJ CW transceivers and MFJ9420 SSB transceiver in size and can be fastened to them.

- Crossed needle SWR/power meter
- Covers 1.8-30MHz
- 4:1 balun included
- Dimensions: 165Wx63 5Hx152D

MFJ971 Portable tuner \$203

Mobile antenna matcher



Help your mobile rig run better with this simple yet effective mobile antenna matcher. Measures 64 x 64 x 40mm.

MFJ910 Mobile antenna matcher \$42.70

lots of antennas!

2mtr 3 el Yagi

The unique design of the MFJ1763 3 element 2mtr yagi allows it to be assembled and disassembled in seconds. Ideal for portable or emergency use, can be mounted vertically or horizontally for either FM or SSB operation and it extends over 50W right across the two metre band.

Can be kept easily in the boot of your car

MFJ1763 \$97.00

2mtr 1/4λ g-plane

2mtr 5/8λ g-plane



■ 2mtr unity gain vertical
■ Fits 25-40mm mast

MFJ1740 \$32.50



■ 2mtr gain vertical
■ Fits 25-40mm mast

MFJ1750 \$49

2mtr 5/8λ magbase

Need a bit of extra punch when mobile? Try this for size and magnetic base convenient!

MFJ1728B \$37.50

Dual Band ground plane



The same size as the MFJ1740 but for both 2 metres and 70cm!

MFJ1730 \$37.50

Dual Band base mobile

With a heavy magnetic base this 19 inch tall antenna is 1/4λ on 2mtrs and 5/8λ on 70cm, with 4 5mm coax and plug. Has BNC adaptor for HTs!

MFJ1724B \$36

2mtr 1/2λ J pole



The ideal saving companion. Roll up your MFJ1730 and stick it in your pocket! J pole type antennas are omnidirectional, have good gain and need no ground plane.

MFJ1730 \$37.50

TERLIN Outbacker™

OUTBACKER™ antennas are pre-tuned multiband whips with a separate top for each band. These models are supplied set up for all amateur bands from 80 through 10 metres. Fine tuning can be done with the extendable top on the antenna.

Get used to the Australian conditions when you want to go mobile.

When you come to mount your antenna why not cut at the Terlin spring base? The OUTBACKER™ spring base is machined from billet brass chrome plated for protection. The spring is zinc plated steel all insulators are Nylon. The base is mounted with a 1/2 inch bolt on the bottom while the antenna base (3/8 UNF stud) screws into the top. Coax fitting is \$0.239.

MT120 Outbacker 12m long \$273
MT121 Outbacker 17m long \$300
MT122 Perth 7m long \$327
MT123 Outbacker Spring base \$110

All band Preselector/tuner



A low cost solution for receiving only where tuning and/or preselection is required. For use at long, medium or short wave this handy little unit covers 150kHz to 30MHz. Has tuner bypass and receiver overriding provisions.

MFJ956 Tuner/Preselector \$99.00

Receiving tuner/preamp



Don't miss that rare DX station because your receive antenna wasn't tuned correctly. With the MFJ959B you can provide proper impedance matching for optimum signal transfer and up to 20dB of preamplifier gain. A 20dB attenuator helps reduce overload problems. Select between two antennas and two receivers. Requires 9-18V DC. 229 x 110 x 150mm.

MFJ959B Receiving tuner/preamp \$225

Selective HF Active Antenna

Preselector circuitry in narrowband modulation provides add-on RF selectivity and reduces the effects of noise from outside the band you have tuned. Inbuilt RF amplifier lets you use the MFJ1020A as a preselector with an external aerial. Covers the frequency range 300kHz to 30MHz. Operates from 9V battery (not supplied) or external 9-18V DC supply. 127 x 50 x 150mm plus telescoping whip.



MFJ1020A Selective active antenna \$199

Duplexers and Triplexers

For dual band or triple band transceivers, multiple radios or sharing a run of coax the duplexers and triplexers offer low loss and excellent isolation for a variety of applications. The M junction shown in the table is an improved JHF type for lower losses.

Model	Passbands	Common Connector	Separate Connectors	Price
MJCTN	LPF 6-30MHz HPF 30-400MHz	NF	LPF SMA HPF NMA	\$50
MTCTN	LPF 6-30MHz HPF 30-400MHz	NF	DPF SMA HPF SMA	\$80
TRIPLEXER HF or 10m / 2m / 70cm / 23cm				
MX3000	LPF 1.5-80MHz HPF 80-300MHz	NF	LPF SMA DPF SMA HPF NMA	\$159
MX3000H	HPF 80-300MHz	NF	DPF SMA HPF NMA	\$159
TRIPLEXER HF or 10m / 2m / 70cm				
MX3000	LPF 1.5-80MHz HPF 80-300MHz	NF	LPF SMA DPF SMA HPF NMA	\$159
MX3000H	HPF 80-300MHz	NF	DPF SMA HPF NMA	\$159



Outdoor Active Antenna

The MFJ1024 is an active receiving antenna designed for use out of doors. Mounted away from sources of electrical noise the MFJ1024 offers the opportunity for reception of signals in the range 50kHz to 30MHz where other types of antennas are just not practical.

The indoor control unit has a 20dB attenuator, adjustable gain, a receiver switch to select between two receivers and an antenna switch to select either the active outdoor antenna unit or an auxiliary antenna. Measures 150 x 75 x 125mm. The remote unit has the 1370mhz whip attached to the amplifier box which is supplied with a mounting plate and hardware to suit most situations. Fifteen metres of RG58 coax with the appropriate plug fitted is supplied connected to the unit. Just hook it up and go! Requires 12V DC supply (not supplied).

MFJ1024 Outdoor active antenna \$293

300kHz-200MHz Active Antennas

The MFJ1022 Active Antenna covers the frequency range 300kHz - 200MHz and will operate with any receiver. A J310FET and an MRF901 transistor combine to give you excellent HF large signal handling and good VHF weak signal performance. The telescoping 500mm detachable whip gives good reception but stores easily.

Wherever you go the MFJ1022 is ready to go with you! Size: 102 x 85 x 32mm, use 9V battery (not supplied) or external DC supply.

MFJ1022 300kHz-200MHz active antenna \$99

even more antennas!

Super-LOOP

The MFJ1786 loop is fully welded from aluminum tube for better Q, lower losses and reduced microphonics compared to others made with flat strip. Ideal for portable operation, flat dwellers, caravan parks or anywhere space is needed. Needs no radials, counterpoise or antenna tuner. MFJ's Super Hi-Q Loop is remotely tuned, but needs no control cable, everything is carried on the coax. Remote control unit for operation from 12V DC or internal battery supplied.

- 5m I, on a 915mm diameter
- Tubular radiator for better performance
- VERY quiet receiving antenna
- Remote controller supplied
- Built-in crossed needle SWR/Power meter
- DC powered for convenience



MFJ1786
10-30MHz continuous coverage loop

\$625

HF roll-up dipoles

Just the thing to use with the MFJ9020, or any other QRP HF transceiver. Lightweight, easy to carry, easy to put up.

MFJ1770	15mtr	\$87
MFJ1771	17mtr	\$87
MFJ1772	20mtr	\$87
MFJ1773	30mtr	\$87
MFJ1774	40mtr	\$87

Efficient 80 & 40 metre vertical

Designed as high performance antenna for 80 and 40 metres, the MFJ1792 features a full size quarter wave radiator for 40 metres — that's a full 10 metres of ruthless radiating power.

End loading, the most efficient form of loading, is used for 80 metres. This is accomplished by a virtually lossless 13m capacitance hat and a high-Q coil wound with Teflon™ covered wire on a low-loss fiberglass form.

The entire length of the antenna is always radiating power. It has a unique built-in L-network for lowest SWR. It is made of high strength 6061-T6 aluminum tubing, super strong solid fiberglass equipping rod and stainless steel hardware.

Handles 1500 watts PEP. 558 includes heavy duty mount. Antennas of this size require guying.

For best possible performance on these low bands you need to use radials, counterpoises or a ground screen.

TRI-BAND version — the MFJ1793 is the same size as the MFJ1792 but includes a full size quarter wave radiator for 20 metres.

MFJ1792
80/40mtr vertical
MFJ1793
80/40/20mtr vertical

\$359

\$405

Half-wave vertical

The MFJ1796 is a truly low cost half wave, ground independent vertical antenna for 40, 20, 15, 10, 6 & 2 metres.

Standing only 3.6m high and with a tiny 60cm foot print the MFJ1796 is a truly useful antenna. Light enough to be handled by just about anybody, but a serious antenna at the same time. Efficient, high-Q loading coils and an air cored balun combine to reduce losses. Durability is assured by the use of heavy walled aluminum tubing, machined aluminum parts and stainless steel hardware. All coils are wound on tough, low loss, ceramic formers using high durability Teflon™ coated wire. Teflon™ insulated coax is used from the decoupling balun to the feedpoint.

A half-wave section for six metres and for two metres adds versatility. You can individually adjust the MFJ1796 on each band. Adjusting one band has minimal influence on other bands.

- Covers 40, 20, 15, 10, 6 & 2 metre bands
- Needs no radials or ground plane
- Made from highest quality materials
- Only 3.6m high

MFJ1796
6 band half-wave vertical

\$449

Hand Held Antennas

For 2 m & 70cm

The MFJ Pocket Linear family has been acclaimed, both here and overseas, as the greatest thing to happen to HT's since the rubber ducky antenna! Gives you a significant increase in range and performance.

MFJ1710 (left) is a 3/8 wave telescoping antenna for 2 metres. Collapses to fit in shirt pocket, complete with clip. Approx 133mm long collapsed, approx. 622mm extended.

MFJ1710 \$24.90

MFJ1712 (center) is a wonder for dual band use. Collapsed (184mm) it is a 1/2 wave on 70cm, extended (482mm) it is a 1/2 wave on 2 & 1/4 wave on 70.

MFJ1712 \$37.50

MFJ1714 (right) is an end fed half wave for two metres which leaves anything else just looking rather sad! Acclaimed in ARAs as 'the best I have ever used' by VK3CCE. He should know, he owns one! Needs no groundplane. When collapsed it works like a rubber ducky.

MFJ1714 \$42.50

The NEW MFJ FlexDuck antennas are compact antennas for your hand-held offering high performance. They can't stab you — they will bend, flex and twist with your ideal where you need gain but can't take the risk on using a solid antenna such as the 'Pocket Jumper' family.

MFJ1717 (right) is a 400mm long FlexDuck which gives top performance in a sale. Easy to use antenna for your 2 metre or 70cm band. The MFJ1717 is a full size half-wave on 70cm and a full size quarter wave on 2 metres.

MFJ1717 \$44

The MFJ1716 (center) is a full size quarter wave on 70cm and a loaded half wave on 2 metres. 223mm tall.

MFJ1716 \$38

MFJ's new 'ShortyDuck' is the ideal replacement antenna for your existing 2 metre hand-held.

MFJ1718 (left) is an efficient 108mm 'ShortyDuck' for 2 metre hand-helds. Impedance matched for maximum gain. The MFJ1718 employs a high Q helix to wound resonator.

MFJ1718 \$30

2m/70cm duplexer

Nowadays we seem to use so many multi-band mobiles, hand-holds and antennas, but often we need to use two radios or two antennas! Obviously we need a duplexer. The MFJ916 duplexer is a compact, low-loss unit for 2m/70cm antennas or radials. UHF socket on common port, UHF plugs on separate ports.

MFJ916 2m/70cm duplexer

\$69

10 band 80-2m vertical

Self support rig and only 6.1 metres tall, the MFJ1798 requires no ground radials and offers terrific performance on 10 amateur bands from 80 through 2 metres.

Separate full size radials are used on 20, 17, 15, 12, 10 and 2 metres. On 6 metres the 17 metres radial becomes a 34x gain radiator. The active radiator works as a stub to decouple everything beyond it. In phase antenna current flows in parallel radials. This forms a very large equivalent radiator and gives you very wide

bandwidths. The radiator stubs provide automatic bandwidthing, and there is absolutely no loss associated with loading coils or traps.

On 80, 40 and 30 metres the MFJ1798 employs highly efficient top-loading to give excellent bandwidth, an efficient, low radiation angle and automatic bandwidthing.

- 10 bands - 75/80, 40, 30, 20, 17, 15, 12, 10, 6 & 2 metres
- Separate full size radials
- End loading for 80, 40 & 30 metres
- Elevated top feed for better performance
- Low radiation angle
- Very wide bandwidth

MFJ1798
10 band half-wave vertical

\$599

Antenna accessories

Heavy duty 4 pos coax switch

Lightning Protection, centre ground pos'n.
The MFJ1704 series switches are designed for use up to 500MHz and are offered with UHF or type-N connectors. They handle a full 2.5kW PEP with extremely low SWR. Isolation is better than 60dB at 30MHz and still >50dB at 500MHz.



MFJ1704 with UHF connectors **\$132.50**
MFJ1704N with N(F) connectors **\$157.50**

MFJ1701 6 positions SO239

The MFJ1701 is a six position switch intended for use up to 2kW PEP in 50 to 75Ω systems at frequencies up to 30MHz. A high quality ceramic wafer switch is used and unused terminals are grounded.



MFJ1701 6 position SO switch **\$78.50**
Remote Coax Switches



The Ameritron RCS-4 is a remote controlled coax switch that selects one of four outputs by supplying all control voltages through the coax cable itself. You get two units, a switching box that mounts outside on the tower or wall and the control console placed at your operating position.

No. of positions 4
Loss at 30MHz < 0.5dB
VSWR < 1.1 from 1.8-30MHz
Power 1.5kW ave
2kW PEP
50mΩ

Switching time **\$297**

RCS-4 HF 4 pos remote switch

The RCS-4V switch allows you to remotely select up to five antennas, so you can replace five runs of coax with one. Your RCS-4V will handle up to 5kW up to 30MHz and 1kW up to 150MHz. Uses 8 core cable (not supplied) to connect the two units.

No. of position 5
Loss (150MHz) < 0.5dB
VSWR < 1.2:1 DC-250MHz
Impedance 50Ω
Power 5kW below 30MHz
1kW at 150MHz

RCS-4V 5pos HF/VHF rmt switch **\$328.80**

Heavy duty 2 pos coax switch

Lightning Protection, centre ground pos'n.

The MFJ1702B is a redesigned version of this very popular switch that combines new features, such as a centre grounded position and 2.5kW PEP (1kW CW) rating for use in 50Ω systems. The new MFJ1702BN with N type connectors is rated to 1GHz. Isolation is better than 60dB at 30MHz and still >50dB at 500MHz. Insertion loss < 0.2dB. SWR < 1.1:2.



MFJ1702B with UHF(F) connectors **\$49.50**
MFJ1702BN with N(F) connectors **\$72.00**

MFJ1700B 2 x 6 positions SO239

The MFJ1700B has two ceramic rotary switches that let you select 1 of 6 antennas and 1 of 6 transceivers in any combination. Rated 2kW PEP for 50-75Ω loads, unused terminals grounded.



MFJ1700B 2 x 6 position HF switch **\$148.00**
Diamond coax switches



Diamond coaxial switches are designed for high performance up to 1000MHz for UHF connector types and to 3000MHz for the 'N' connector type. Rated at 1.5kW they offer extremely low VSWR and insertion loss with excellent isolation throughout their frequency range.

DM-CX210A 500MHz UHF(F) connectors **\$79**
DM-CX210N 3GHz N(F) connectors **\$149**

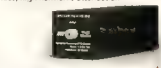
Low-Pass filters for HF

This is the best low pass filter we have tested. Crafted from the finest materials the Benchler low pass filter offers a minimum of 80dB attenuation in tests conducted to measure the harmonic suppression in CH 2 TV and higher.



MI093 Benchler Lowpass filter **\$109**
MFJ Lowpass Filter

Eliminate or minimize TVI with the MFJ low pass filter. Ensure your transceiver does not cause harmonic interference to your neighbour's TV. Rated to carry 1.5kW from DC-30MHz, SWR < 1.5:1, minimal insertion loss, high harmonic attenuation.



MFJ704 Lowpass filter **\$80.50**

50Ω Dummy Loads

1kW DC-400MHz



The MFJ250X handles 1kW CW or 2kW PEP for 10 m n 200W CW or 400W PEP cont. Fil with transformer or 1 (not supplied). Low VSWR 1.2:1 to 40MHz, 1.5:1 30-300MHz, 2:1 300-400MHz. Safety vent with removable cap. SO-239 connector, measures 191 H x 168 DIA, w th carrying handle.

MFJ250X 1kW air type load **\$75.00**

1.5kW DC-650MHz



Another MFJ first! This load will handle 1.5kW for 10 seconds, 100W for 10 minutes. SWR < 1.1 at 30MHz, < 1.3 at 650MHz and usable to 750MHz. Measures 75 x 75 x 178mm.

MFJ264 1.5kW load UHF connectors **\$135.00**
MFJ264N 1.5kW load N connectors **\$158.00**

300W DC-150MHz

The MFJ260B air cooled dry load is rated at full load for 30 seconds, and is supplied with a derating curve. SWR < 1.1:1 to 30MHz < 1.5 30-150MHz, 57 x 57 x 178mm.



MFJ260B 300W load UHF connectors **\$75.00**
MFJ260BN 300W load N connectors **\$89.00**

50Ω Load resistors



These precision 50Ω carbon on ceramic resistors are the same high quality parts used in the MFJ260B and MFJ264 loads.

RA38 **\$52.03** **RA39** **\$86.40**

Coax-Seal sealant



If you have any type of outdoor antenna you should be using Coax-Seal sealant. Coax-Seal is a black rubber based material especially designed to protect any outdoor connection or connector.

Coax-Seal is a non-conductive, non-contaminating, waterproof substance which remains flexible at any temperature. Coax connectors are not waterproof, and exposed solder connections will deteriorate.

Available in two sizes — please enquire for volume pricing.

HD124 CoaxSeal 12.7mm x 1.5m **\$5.50**

HD125 CoaxSeal 25mm x 14.5m **\$14.50**

AMERITRON

Valve & Solid State HF linears

ALS-500M 600W SOLID STATE 13.8V DC LINEAR



ALS-500M

600W PEP solid state linear

\$1850

- Fully solid state - no tuning
- 600W PEP, 400W CW output
- Continuous coverage 1.5 - 30MHz
- Load fault & thermal protection
- Excellent harmonic suppression
- Compact: 89 x 229 x 381mm weighs 3.5kg
- Requires 13.8V @ 80A peak

Now, an economical fully solid state amplifier for mobile, portable or base station use. With less than 100W drive into the low SWR input of the ALS-500M you get a full, quiet 600W PEP output. This amplifier is well protected and is built with traditional American made Ameritron pride and quality.

ALB11 600W PEP HF Linear amplifier

Input:

Circuit type: Pi-network, slug tuned coils
Maximum drive power permissible: 100 watts
Typical drive for rated output: 75 watts

Output:

Circuit type: Pi-network
30 second carrier: 550 watts
1/2 hour PEP two tone: >600 watts
Efficiency: typically >70%

Power Supply:

Full load voltage: 1500 V
Full load current: 550 mA
AC input: 240V 50Hz max 4A

Metering:

Vu meter: reads HV and plate current
Grid meter: reads PA grid current
A.C. Negative going, 0-20 V adjustable

Efficiency

CW & SSB (envelope crest): >70%

Physical:

Dimensions: 406D x 350W x 203H

Weight: 13.7kg

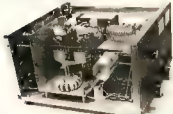
Frequency Coverage

160 80 40 30 20 17 15 12 and 10 metres

Third Order IMD at Rated Output: -33dB

ALB11H 4x811A 800W PEP

Four 811A tubes, fully neutralised. Covers all bands 160-10 metres. Tubes mounted vertically for reliable operation, has ALC and can be fitted with QSK-S for full QSK.



ALB11H 800W PEP linear amp

\$2095

QSK-S PIN DIODE QSK switch

Utilising the latest n PIN-diode technology the QSK-S will handle 2.5kW PEP, 2kW CW in normal amateur service with SWR < 1.5. Handles 750W in continuous modes like RTTY, SSB and FM. Connected externally to the amplifier. Extremely quiet in operation. Optional cooling fan will permit 1500W continuous operation.



QSKS 2.5kW QSK switch

\$785



Shades of the magnificent past! Remember the days when a power amplifier looked like it meant business and was heavy enough to convey the message? Well those days are back! Ameritron's ALB11 uses three 811A tubes in Class AB2 grounded grid to deliver a clean, comfortable 600W PEP. The ALB11 amplifier needs only 40W of drive for the VK legal limit.

ALB11

600W PEP HF linear

\$1460

AL1200 - 3CX1200A7 1.5kW PEP

With a serious transmitting tube and a series Peter Dehl 'C' core transformer the AL-1200 is an extremely rugged, yet affordable linear. QSK available as an option.



AL1200 1.5kW PEP linear amp

\$4850

AL1500 - 3CX1500 1.5kW PEP

With only 65W drive the 3CX1500 (\$877) in the AL-1500 will deliver a full 1.5kW PEP.



AL1500 1.5kW PEP linear amp

\$6050



**No tuning, no fuss, no worries,
just turn on and operate!**

The revolutionary new Ameritron ALS 600 amplifier is unique - it uses four rugged 6X4 Power MOSFET transistors to deliver 700W PEP with a clean output and unrivalled solid state performance.

Intended for base station operation on, the ALS-600 is supplied with a multi-output 50V power supply complete with power supply voltage and current metering.

- Output 700W PEP, 600W CW
- Continuous coverage 1.8-30MHz
- Instant bandswitching, no tuning, no warm-up
- SWR protection prevents amplifier damage
- Over power protection with A.C.
- Extremely quiet!
- Compact, 152 x 241 x 305mm
- 12V DC output to power accessories
- Choose input power supply for improved regulation and reduced AC line current peaks
- Fully tested in Austria before delivery

The matching ALS-600PS power supply, supplied with the ALS-600 is the same size as the amplifier and supplies as 50V DC at up to 25A for the amplifier. Power supply can be mounted out of the way to reduce clutter and congestion on your operating bench.



ALS600

700W PEP HF linear

\$2995

AL80B - 3-500Z 1000W PEP

Combine Ameritron's Dynamic ALC technology with instantaneous RF B as and an Eimac 3-500Z and you have one of the best possible 1kW linear you can buy. QSK available as an option.



AL80B 1kW PEP linear amp

\$2850

AL82 - 2 x 3-500Z 1.5kW PEP

The classic contesters' linear with a pair of Eimac 3-500Z tubes and a 1.8kW power supply. Like all Ameritron's, near 1 covers 160-10 metres.



AL82 1.5kW PEP linear amp

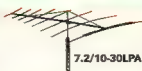
\$4650

KLM

ANTENNAS, INC.

HF Log Periodics

Model	10-30-7LPA	7.2/10-30LPA
Frequency MHz	10-30	7.2/10-30
Gain dBi	7typ	3/7typ
Length M	9'5"	12.8
Elements	7	8
Price	\$2500	\$2900



7.2/10-30LPA

10-30-7LPA



KT-34XA

KT-34A

Model	KT-34A			KT-34XA		
Frequency MHz	14-14.35	21-21.45	28-28.87	14-14.35	21-21.45	28-28.87
Gain dBi	7	7	7	8.5-8	8-9.5	11-11.3
Elements	4			6		
Length mtrs	4.87			9.75		
Price	\$1250			\$1800		

When the quest is for excellence in antennas there can only be one result... and this is it!

From one of the world's great antenna manufacturers, just for you!

Every KLM antenna is designed with the amateur in mind, but with no sacrifice of quality. Made from only the best weather-resistant materials, Lexan insulators and a stainless steel hardware, these antennas are quite possibly the best you can buy, but they also have a price tag to match. The entire range is shown on these pages. Many towns have a local radio shop for immediate delivery. Others are usually available within 4 to 5 weeks from the USA. So whatever your interests try KLM and enjoy!

What makes one manufacturer stand out?

In the case of antennas it is simple. The designs must be good. These are, they have been created by some of the best designers in the business. The materials must be good. These are, because only the best will do for the craftsman at KLM. They select only the best quality aluminum alloys for booms and elements, all stainless steel hardware, precision-molded insulators and the best quality materials for baluns and chokes. The antennas must work, and without doubt the owners of KLM antennas will tell you that their antennas do work.

Time and time again the products of this one company have been proven to perform beyond expectations by commercial, government and amateur users. Place your faith in KLM and you can be assured of spare parts availability for many years to come as well as one of the best antennas you can buy.

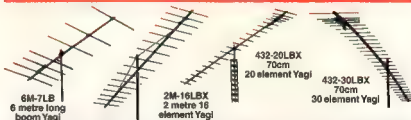
But how do we know they are the best? The copiers tell us, if these weren't the best antennas you could get, why would so many people want to copy them? Trouble is you can never rely on the copy to perform as well as the original. Can you?

HF Monoband beams & Rotatable dipoles

Model	20M-6	20M-8	20M-4	19M-6	15M-4	10M-6	10M-4
Frequency MHz	13.8-14.4	13.8-14.4	13.8-14.4	21-21.5	21-21.5	28-30	28-30
Gain dBi	11	9.7	7.7	11	7.7	11	7.7
Length M	17.38	12.8	8.4	10.27	4.27	8.28	3.05
Elements	6	5	4	5	4	8	4
Price	\$2360	\$1640	\$1060	\$1325	\$576	\$830	\$525

Model	80M-3	80M-2	80M-1	40M-4	40M-3	40M-2	40M-1
Frequency MHz	3.5-4	3.5-4	3.5-4	7-7.3	7-7.3	7-7.3	7-7.3
Gain dBi	7	4	0	7.2	6.5	4.9	0
Length M	16.3	10.6	NA	12.8	9.75	4.88	NA
Elements	3	2	1	4	3	2	1
Price	\$10500	\$5900	\$1930	\$2300	\$1700	\$1250	\$510

VHF & UHF Antennas



Model	6M-5	6M-7LB	2M-6	2M-11X	2M-13LBX	2M-15LBX	440-10X	440-18X	432-20LBX	432-30LBX
Frequency MHz	50-52	50-52	144-148	144-148	144-148	144-148	420-470	420-450	420-450	420-440
Gain dBi	9.7	11.5	10.3	12.5	13.3	14.5	11.5	13.5	15.5	17.9
Length	3.6	7.85	2.21	4.67	6.55	8.54	1.45	3.66	3.76	8.68
Elements	5	7	8	11	13	16	10	18	20	30
Price	\$522	\$760	\$254	\$218	\$248	\$506	\$171	\$313	\$378	\$443

23cm (1.2 GHz) ANTENNAS

The KLM antenna range for 23cm are all supplied completely assembled and pre-tuned at the factory, with the exception of the 44 element version which is in two pieces requiring only simple assembly.



1.2-44LBX

Model	1.2-15LBX	1.2-24LBX	1.2-44LBX
Frequency MHz	1200-1300		
Gain dBi	13.8	16.2	18.2
Elements	15	24	44
Length mtrs	1.87	1.92	3.78
Price	\$238	\$285	\$398

SATELLITE ANTENNAS

Every KLM satellite antenna is supplied with any necessary phasing harness and a remote polarisation switch. Non-conducting fibreglass booms, rotor systems and complete tracking systems are also available.



2M-14C

435-40CX

Model	2M-14C	2M-22C	435-18C	435-40CX
Frequency MHz	144-150	144-148	420-450	420-440
Gain dBi	11	13	12	5.2
Elements	2x7	2x11	2x5	2x20
Length mtrs	3.27	3.92	2.23	4.45
Price	\$423	\$553	\$550	\$589



These preamplifiers from M-range Communications use the latest in GaAs-FET technology to provide every VHF/UHF amateur with one of high quality amplifiers for use indoors or at the masthead. Mastmount versions as well as in-shack types are available.

M-range preamps can be controlled and powered by radio such as the ICOM C-271/471 & 275/475/575 which have internal preamp power supply and control facilities.

- Automatic RF switching
- GaAs-FET for best performance
- In-line design for ease of operation
- Switchable gain settings
- Gain of >20dB, Noise figure < 0.6dB
- Power handling 160W
- Power - nominal 13.8V DC
- Mast mount (KP2) has DC coupler supplied

KP1/10M	28-30MHz In-shack preamp	\$279
KP1/6M	50-54MHz In-shack preamp	\$279
KP1/2M	144-148MHz In-shack preamp	\$279
KP1/70cm	430-450MHz In-shack preamp	\$279
KP2/10M	28-30MHz Masthead preamp	\$329
KP2/6M	50-54MHz Masthead preamp	\$329
KP2/2M	144-148MHz Masthead preamp	\$329
KP2/70cm	430-450MHz Masthead preamp	\$329



Butternut Electronics Co. has been producing what are possibly the world's most loved vertical antennas for amateur HF use for many years. Whether you need 80 & 40 metres or all 9 bands, eighty through 6 metres, you will find a Butternut antenna combination to suit. The ever popular HF-6V can have 160 metres added to it, as can both the HF-9V and the HF-2V.

All Butternut antennas and accessories are in stock at Daycom right now, just waiting for your call!

Butternut HF-6V

Butternut's most popular vertical, covers 80-10metres, 12 & 17 metres can be added with the A17 12 kit, 6 metres with the A6 kit and 160 metres with the TBR-160S kit. The HF-6V can be used with any of the Butternut accessories listed on this page.

Electrical and Mechanical Specifications

Shipping weight: 5.4 kg
Height: 7.9 m
Feedpoint impedance: nominal 50Ω through included matching line

VSWR at resonance: 1.5:1 or less on all bands in typical ground level or above ground installations

Bandwidth for VSWR of 2:1 or less:
10 metres — 1500 kHz
15 metres — entire band
20 metres — entire band
30 metres — entire band
40 metres — 280 kHz
80/75 m — 40 to 100 kHz

Power Rating:
Wind loading: 1.5kW SSB and CW all bands
Unguyed wind survival: 0.49 sq metres

129 km/h assuming no icing or precipitation

Installation

Comes complete with 0.6m tubular mounting post (15.8mm O.D.) for direct placement in earth or into standard steel TV mast (19mm O.D. with 15mm wall) or Butternut Mounting Post Sleeve (Model MPS). Eye-level adjustment of 80, 40 and 30 metre resonator coils, length adjustment on 15 and 10 metres, 20 metre adjustment is a function of 40 and 30 metre tuning coils. For 80/75, 40 and 30 metres is 4.76mm diameter aluminium wire, air wound and self supporting, typical spacing between adjacent turns is 12.7mm, or greater.

HF6V 6 band HF vertical \$423

18 & 24 MHz WARC Band Adaptors

Allows the Butternut S and 6 band verticals to operate on the 18 and 24 MHz WARC bands with full automatic switching. Model A-17-12 (not shown).

A1712 17 & 12 metre add-on kit \$100

160 Metre Adaptor (Model TBR-160 S)

Attaches to the base of Butternut HF verticals for automatic bandswitching 160 through 10 metres with a slight reduction in 80/75 metre bandwidth 160 metre bandwidth for 2:1 SWR is 10-20 kHz depending on ground losses. Rated at 500 watts CW. 1200 watts PEP input to final.

TBR160S 160 metre add-on kit \$160

30 metre Resonator Kit

Model 30 MRK Resonator kit for 30 metre operation. Not for use with Top Loading Kit.

30MRK 30 metre add-on kit \$100

Top Loading Kit 80 - 40 Metres

Model TLK Top loading kit of 4 x 7.60m stranded umbrella wires. Provides increased bandwidth and efficiency on 80 and 160 metres. (The top loading kit cannot be used with the 30 metre resonator)

TLK Top loading kit for 80 & 160 mtrs \$48

Roof Mounting Kit (Model RMK-2)

For model HF-6V and other Butternut verticals. Includes 2-ft tripod tower, STR-1 radial kit, mounting post sleeve (Model MPS), plated lag screws and complete instructions. Shipping weight: 4.9 kg.

RMK2 Roof mounting kit \$155

Butternut HF-9V

The Butternut HF9V-X is the same as the HF6V-X but includes WARC bands and the 6 metre kits in a single package.

Bandwidth for less than 2:1 SWR:
6 metres 18MHz
10 metres 1500 kHz
12 metres 200kHz
15 metres entire band
17 metres 200kHz
20 metres entire band
30 metres entire band
40 metres 280 kHz
80/75 m 40 to 100 kHz

HF9V 9 band HF vertical \$529

DX the 80 & 40 Metre Bands

Self-supporting vertical antenna designed for optimum performance on the 80 and 40 metre bands. Features full automatic band switching using Butternut's exclusive Differential Reactance Tuning system. Provides greater radiation at lower wave angles.

Electrical and Mechanical Specifications

Height: 9.75 m
Feedpoint impedance: 50Ω
VSWR at resonance: 1.5:1 or less
Bandwidth for VSWR of 2:1 or less: 40 metres full band
80 metres 90 kHz
Power Rating: 1 kW 80 & 40 metres
Unguyed wind survival: 97 km/h

HF2V 80 & 40 metre vertical \$400

A no-radial vertical that covers 80 or 75 metres?

THERE IS ONE NOW!

No, we won't take your intelligence by telling you that it's a "half wave" or that ANY vertical will operate more efficiently without a good rad system than with one; it certainly won't! But if you've no room for even the smallest radial system just install the most efficient multiband vertical in the business, the HF9V, over our counterpoise kit BN-CPK. You'll not only save a tidy sum but you'll work DX that the shorter and more lossy no-radial "half-wave" can't touch because both the HF6V and HF9V use longer active element lengths for higher radiation resistance and greater efficiency on more bands than any of the so-called half-waves. Ask for the free brochure and receive technical note D-5-1 "Dirty Little Secrets from an Antenna Designer's Notebook" that shows you how to calculate the probable efficiency of any vertical antenna using the manufacturer's own specs — so you won't have to learn the trade the hard way!

Counterpoise Kit

Model CPK Counterpoise Kit for Butternut models HF6V-X and HF9V-X substitutes for ground or elevated radials. Self-supporting tubing bolts onto base of antenna. Mast not provided.

CPK Counterpoise kit \$110

Stub Tuned Radial Kit (Model STR-2)

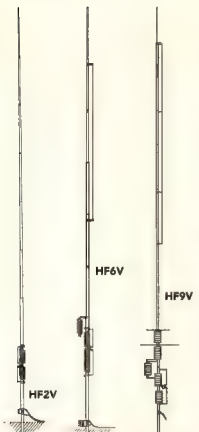
Kit of four stub-tuned radial sets for 40, 20, 15 and 10 metres, each 11.8m long and completely assembled with end insulators. Also includes 30 lag 30 metre radials (7.3m) and one 75/80 metre radial (maximum length 20.7m).

STR2 Stub tuned radial kit \$100

Mounting Post Sleeve (Model MPS)

A 600mm tube of 32mm diameter aluminium to accommodate mounting post of HF6V/V. May be left in earth for easy removal of antenna and mounting post, recommended as protection in installations where U-bolts or lacing bolts connect the mounting post.

MPS Mounting post sleeve \$20



Butternut HF5B MiniBeam



For gain where you really didn't think it was possible! The BUTTERNUT HF5B "Butterfly" beam is designed for those locations where just about any other rotatable antenna won't fit. This compact beam uses no messy traps and can be turned with a small rotator. High quality stainless steel hardware is used throughout to ensure your HF5B will last.

HF5B specifications:

Bandwidth for <2:1 VSWR—

10 metres 1500kHz
12,15,17m entire band
SWR at resonance: ≤1.5:1
Gain:
10 metres 5dBd
12 metres 5dBd
15 metres 5dBd
17 metres 0dBd
20 metres 3dBd

Front to back ratio: 20dB

Front to side ratio: 30dB

Power handling: 1kW

Feed impedance: 50Ω

Wingspan: 3.84m

Boom length: 1.83m

Turning radius: 2.12m

Vertical spreaders: 1.83m

HF5B 5 band mini beam \$650

HF Yagis

World Ranger

Multiband YAGIS for 10, 12, 15, 17, 20, 30 & 40 M

Our three and four element inband beams provide the variety and performance you need for reliable communications around the world. Cushcraft's World Rangers are made to last with 6063-T832 aluminum tubing, weatherproof traps, stainless steel hardware and fiberglass insulators. They are designed with fewer parts for easier assembly, lower weight and less windload.

The add-on kits shown below can be used to add 30 or 40 metres to the A35 and A45 or 30 metres to the unique WARC band A3W5 dual band beam.

Model	A35	A30	A3W5
Frequency, MHz	28.2-21.1	28.2-21.1	24-18
Number of elements	4	3	3
Forward gain, dBi	8.9	8	8
Front to back ratio, dB	16	14	16
Power, watts PEP	2000	2000	2000
Boom length, metres	9.48	4.27	4.27
Longest element, mtrs	9.75	8.45	7.65
Turning radius, mtrs	5.68	4.72	4.4
Max mast size, mm	50	50	35
Wind load, square metres	31	47	33.24
Weight, kg	16.6	12.5	10.24
Price (inc tax)	\$1099	\$816	\$689

World Ranger

30 & 40 mtr add-on kits

Model	A743	A744	A745	A746
Frequency, MHz	7	7	7	7
Driven element length	10.75	8.88	10.75	8.88
Wind load, square metres	.25	.23	.25	.23
Bandwidth, MHz	125	150	125	150
Power, watts PEP	2000	2000	2000	2000
Weight, kg	1.6	1.09	1.6	1.09
Price (inc tax)	\$299	\$299	\$299	\$299

ROTATABLE DIPOLES



Model	D40	D41	D42	D43W
Frequency	7	3.7-11.1	3.7-11.1	24-18.10
Bandwidth, MHz	220	2000	2000	2000
Power, watts PEP	1000	2000	2000	2000
Length, metres	12.88	10.39	7.68	10.37
Wind load, square metres	12	12	3.8	3.8
Weight, kg	3.5	3.8	4.1	3
Price (inc tax)	\$507	\$566	\$419	\$429

Cushcraft's rotatable dipoles come in four models: a single band for 40 metres, three and four banders, as well as the unique D3W for three WARC bands. Their size means they can be mounted high above trees for better performance than a wire dipole without the worry of a tangle on a tall mast or tower.

HF vertical and beam antennas

Multiband HF verticals

Half-wave verticals for R5, R7 7, 10, 14, 18, 21, 24, 28 MHz

IT'S THE ONE YOU'VE ASKED FOR! Amateur radio's most popular vertical antenna design now gives you 30 & 40 metres WITH NO GROUND RADIALS! Only 6.9 metres (22.5 feet) tall, the R7's small footprint and ground independence gives you mount anywhere flexibility. Ideal for confined spaces and unobtrusive in home units, the R5 and R7 offer single assembly (it takes about sixty minutes) automatic frequency selection and only 7' short (1 metre) counterpoise rods mean you worry about DXing, contesting or rag-chewing, not what the neighbours or XYL think!

Convenience is only one reason to own a Cushcraft R5 or R7 vertical—the main reason is performance. The only connection to your rig is a single coax. No band switching, no remote tuning and you can have amateur radio's best performance to size ratio antenna on 30 & 40 metres—a total of SEVEN bands today.

Model	R5	R7
Frequency, MHz	28.2-21.1, 18.1, 14	28.2-21.1, 18.1, 14, 10, 7
Gain, dBi	3	3
Electrical length	Half-wave	Half-wave
SWR 2:1 bandwidth	Full band	Full band
Power, watts PEP	1800	1800
Radiation angle	19°	19°
Height, metres	5.2	5.5
Max mast size, mm	45	45
Wind load, square mtr	13	21
Weight, kg	4	5.8
Price (inc tax)	\$702	\$937

HF Verticals

80 - 10 metres

As well as the popular and very successful half-wave verticals, the R5 and R7, Cushcraft offers three, five and eight band quarter-wave verticals with high quality, heavy duty construction with all stainless steel hardware. These compact antennas are ideal wherever you have the space for ground radials but not for a beam antenna.


For use with any of these antennas the APR18 radial kit consists of 6 pre-cut radial assemblies with connecting lugs already to attach to the base of the antenna.

Model	AV5	AV6	AP8A
Frequency, MHz	28.2-14.1/13.5	28.2-14.1/13.5	28.2-14.1/13.5
Gain, dBi	3	3	3
Electrical length	1/4-wave	1/4-wave	1/4-wave
SWR 2:1 bandwidth	Full band	Full band	Full band
Power, watts PEP	2000	2000	2000
Radiation angle	19°	19°	19°
Height, metres	4.0	5.4	7.68
Max mast size, mm	45	75	42
Wind load, square mtr	12	18	14
Weight, kg	3	5.8	4.2
Radials required	6	6	6
Radial kit to suit	APR18 (see p. 6)	APR18 (see p. 6)	APR18 (see p. 6)
Price (inc tax)	\$207	\$424	\$535

Cushcraft R7

Skywalker Monoband Yagis

20-4CD



Model	19-4CD	19-3CD	19-2CD	19-1CD	19-0CD	20-4CD	20-3CD	20-2CD	20-1CD
Frequency	28.2-7	28.2-7	28.2-7	24-18	24-18	24-18	24-18	24-18	24-18
Number of elements	4	3	3	4	3	4	3	3	3
Forward gain, dBi	10	8	8	10	8	10	8	8	8
Front to back ratio, dB	20	20	20	20	20	20	20	20	20
Power, watts PEP	2000	2000	2000	2000	2000	2000	2000	2000	2000
Boom length, metres	4.88	3.05	2.44	6.10	4.27	9.75	8.11	6.1	6.1
Longest element, mtrs	5.34	3.58	2.88	7.71	7.08	11.18	10.36	10.36	10.36
Turning radius, mtrs	3.3	3.35	3.0	4.72	4.11	7.2	6.1	7.2	7.2
Max mast size, mm	50	50	50	50	50	50	50	50	50
Wind load, square mtr	29	21	20	42	32	75	51	51	51
Weight, kg	11.4	5	4.5	11.4	5.1	25	13.7	20	20
Price (inc tax)	\$507	\$390	\$264	\$605	\$517	\$1072	\$750	\$1072	\$1072

VHF & UHF Vertical and beam antennas

FM Yagis



For both voice and for packet operation, Cushcraft's FM Yagis and Boomer FM Yagis are ideal choices no matter what type of operation you are interested in. If gain, clean radiation patterns, ease of assembly and materials of the highest quality are all part of the story.

Model	A148-2B	A148-10S	A148-20S
Frequency, MHz	144-148		
Number of elements	3	10	20
Forward gain, dB	7.8	13.2	18.2
Front to back ratio, dB	25	28	34
Power, watts PEP	1000	1000	1000
Boom length, metres	1.00	3.8	2.0x3.8
Turning radius, mtrs	8	1.8	2.0
Max mast size, mm	81	51	51
Wind load, square mtr	.08	.11	.25
Weight, kg	7	2.7	6.8
Price (inc tax)	\$92	\$163	\$447

OSCAR Antennas

Here's the system to get you going for amateur satellite operation. The Cushcraft AOP-2 OSCAR Pack includes the 735XB for 70cm, and the 22XB for 2meters. The 70cm antenna has a polarisation switching relay and the pack includes all details and dimensions for assembling your own OSCAR antenna system.



Model	22XB	735XB
Frequency, MHz	144-148	144-148
Gain, dB	14	15.3
2-W VSWR bandwidth	449Hz	88Hz
Power, watts PEP	600W	220W
Boom length	3.8	4.37
Turning radius	3.36	2.8
Wind load, square mtr	.04	.13
Weight	5	5.5
Price	\$560	\$536

Blitz Bug Lightning arrestors

The Cushcraft Blitz Bug arrestors use a patented three point static discharge cell design. They have a sealed chamber, constant static drain and controlled discharge. Blitzbugs are rated at 2kV to 500VHz with negligible insertion loss.

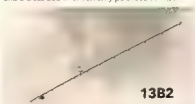
LAC1 with UHF plug & UHF socket
LAC2 with UHF sockets



\$28.80
\$28.80

Boomer FM, SSB and CW Yagis

The Cushcraft Boomer range are state of the art VHF and UHF Yagis, supplied complete with all necessary mounting hardware. The 2582 is a combination of two 13B2s and a cross boom for vertically polarised FM use.



Model	011-02	13B2S	13B2	13B2	2582	0502
Frequency, MHz	144-148	144-148	144-148	144-148	144-148	144-148
Number of elements	4	4	11	11	11	11
Forward gain, dB	10	10	14.4	14.4	14.4	14.4
Front to back ratio, dB	20	20	28	28	28	28
Power, watts PEP	2000	2000	2000	2000	2000	2000
Boom length, metres	10	10	4.1	4.1	4.1	4.1
Longest element, mtrs	2.1	1.14	1.02	1.02	1.02	1.02
Turning radius, mtrs	5.26	2.7	2.7	2.7	2.7	2.7
Max mast size, mm	51	51	51	51	51	51
Wind load, square mtr	.08	.12	.12	.12	.12	.12
Weight, kg	7.50	1.25	1.1	1.1	1.1	1.1
Price (inc tax)	\$810	\$141	\$274	\$472	\$276	\$315

Sideband Yagis

The performance of these budget antennas will surprise you! They are light weight, durable and easy enough to assemble that you will be on air in an afternoon. Good bandwidth, tapered elements and direct 50Ω matching with the Cushcraft "Reddy-Match" make these fine antennas a delight to use.



Model	AR-3B	AR-3S	AR-3S	AR-3S	AR-3S	AR-3S
Frequency, MHz	144-148	144-148	144-148	144-148	144-148	144-148
Number of elements	4	4	4	4	4	4
Forward gain, dB	10	10	10	10	10	10
Front to back ratio, dB	20	20	20	20	20	20
Power, watts PEP	100	100	100	100	100	100
Boom length, metres	4	4	4	4	4	4
Longest element, mtrs	3.0	3.0	3.0	3.0	3.0	3.0
Turning radius, mtrs	5.0	5.0	5.0	5.0	5.0	5.0
Max mast size, mm	51	51	51	51	51	51
Wind load, square mtr	.10	.10	.10	.10	.10	.10
Weight, kg	1.5	1.5	1.5	1.5	1.5	1.5
Price (inc tax)	\$225	\$260	\$448	\$102	\$113	\$116

Lightning arrestors

Protect your valuable equipment from lightning induced surges of up to 5000 amperes with a Cushcraft constant impedance gas discharge lightning arrestor! The LAC4 series have replaceable gas tubes which clamp surges to about 50V or about 100 nanoseconds, much quicker than the voltage rise time of lightning pulses.

LAC4 200 watt with UHF connectors	\$81.30
LAC4H 2kW with UHF connectors	\$89.40
LAC4N 200 watt with N connectors	\$105.70
LAC4NH 2kW with N connectors	\$109.80
LC2 200 watt replacement cartridge	\$34.55
LC2KW 2kW replacement cartridge	\$38.62

Ringo Verticals

10, 6, 2 metres & 70cm

The basic Ringo family are 1/2 wave length designs which have the antenna connected to the mast for DC and so have no lightning protection. Nor do they build up static charge like many other designs to interfere with your enjoyment of the amateur VHF and UHF bands.

Model	AR-10	AR-6	AR-2	AR-400
Frequency, MHz	144-148	144-148	144-148	144-148
SWR 2:1 Bandwidth, MHz	1.0	1.0	1.0	1.0
Gain, dB	2.5	2.5	2.5	2.5
Power, watts PEP	1000	1000	1000	1000
Radiation angle	10°	10°	10°	10°
Height, metres	10.0	6.1	2.0	4.0
Max mast size, mm	51	51	51	51
Wind load, square mtr	1.0	0.3	0.08	0.1
Weight, kg	1.80	1.14	0.08	0.40
Price (inc tax)	\$130	\$130	\$94	\$94

Model	ARX-2
Frequency, MHz	144-148
SWR 2:1 Bandwidth, MHz	1.0
Gain, dB	4.0
Power, watts PEP	1000
Height, metres	3.3
Max mast size, mm	51
Wind load, square mtr	.08
Weight, kg	1.80
Price (inc tax)	\$116

RINGO RANGER

For that bit of extra gain where space does not permit the installation of deepspacing radials for an antenna such as the ARX2B then the ARX2 is for you.

RINGO RANGER II

Cushcraft's Ringo Ranger II has more gain, less wind load and greater mechanical rigidity than other two metre antennas. You will readily appreciate the benefits of this amazing antenna! The Ringo Ranger II has built-in lightning protection, UV stabilised insulators, heavy duty heavy wall tubing, improved deepspacing radials to prevent feed line distortion and all weather performance only available in antennas costing many times more is the performer - over 500,000 hours have been used world wide!

Model	ARX2B	ARX400B
Frequency, MHz	144-148	144-148
SWR 2:1 Bandwidth, MHz	1.0	>1.0
Gain, dB	3.3	7
Power, watts PEP	1000	1000
Radiation angle	7°	7°
Height, metres	4.3	1.5
Max mast size, mm	51	51
Wind load, square mtr	.08	.08
Weight, kg	3.73	.5
Price (inc tax)	\$140	\$140

Dual Band Ringos

Experience the performance and appearance advantages of an all-aluminum dual band antenna. The ARZ70 and ARZ70B incorporate Ringo Ranger technology in a lightweight and durable design with all standard size hardware.

A single coax is all you need to get your new dual band ring working to its full performance.

Model	ARZ70	ARZ70B
Frequency, MHz	144-148	144-148
SWR 2:1 Bandwidth, MHz	1.0	1.0
Gain, dB	3.7	5.5
Power, watts PEP	250	250
Height, metres	6.13	3.3
Max mast size, mm	51	51
Wind load, square mtr	.08	.04
Weight, kg	3.1	1.26
Price (inc tax)	\$175	\$254

The NEW ARZ70B has two 1/4 elements on 2 metres and four 1/4 elements on 70cm. It is broadbanded for minimum SWR on both bands. It is easy to assemble with three rigid aluminium tubing sections, a durable mast mount and factory sealed coils for best performance.



New to DAYCOM this year is the **Diamond Antenna** range of fine HF, VHF and UHF antennas from Japan. Made from the highest quality materials these antennas should serve you well for many years to come!

DIAMOND HF WIRE ANTENNAS



W4910 \$249

Five band wire trapped dipole, 80, 40, 20, 15, 10 metres

- Maximum power rating 1.2kW(PEP)
- Length 19.2m
- Weight 2.5kg

MT105 \$199

Two band wire trapped dipole, 80, 40 metres

- Maximum power rating 1.2kW(PEP)
- Length 26m
- Weight 1.85kg

MT103 \$199

Two band wire trapped dipole, 40, 15 metres

- Maximum power rating 1.2kW(PEP)
- Length 12.4m
- Weight 1.2kg

DIAMOND HF TRAPPED VERTICALS

CP6 6 band trapped vertical

- Bands: 80, 40, 20, 15, 10 & 6 metres
 Max Power: 200W SSB
 Impedance: 50Ω
 VSWR: <1.5:1
 Length: 4.6m
 Radial length: approx 1.8m
 Weight: 4.9kg
 Mast size: 30-62mm

CP6 6 band trapped vertical \$579

CP5 5 band trapped vertical

- Bands: 80, 40, 20, 15 & 10 metres
 Max Power: 200W SSB
 Impedance: 50Ω
 VSWR: <1.5:1
 Length: 4.6m
 Radial length: approx 1.8m
 Weight: 4.5kg
 Mast size: 30-62mm

CP5 5 band trapped vertical \$539

CP725 4 band trapped vertical

- Bands: 40, 15, 10 & 6 metres
 Max Power: 200W SSB
 Impedance: 50Ω
 VSWR: <1.5:1
 Length: 3.4m
 Radial length: approx 1.8m
 Weight: 3kg
 Mast size: 30-62mm

CP725 4 band trapped vertical \$469

RADIO

WORKS

Carolina Windom 160

160-10 metres



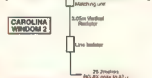
- Specifications**
 Bands: 160 - 10 metres
 Radiator length: Horizontal 68.58m
 Feedline: 50Ω coax cable
 Matching: Matching unit & transmatch
 Transmatch: Yes, needed
 Power Rating: 1500 Watts
 Rec. Height: 12m, usable at 10.7m

MT105 \$220 MT103 \$169

Carolina Windom 160 Carolina Windom

Carolina Windom 2

40-10 metres inc. WARC bands



- Specifications**
 Bands: 40 - 10 metres
 Radiator length: Horizontal 20.13m
 Feedline: 50Ω coax cable
 Matching: Matching unit & transmatch
 Transmatch: Yes, needed
 Power Rating: 1500 Watts
 Rec. Height: 9.2m, usable at 7.4m

MT104 \$169

Carolina Windom 2

Carolina Beam

80, 40, 20, 17, 15, 12, 10 metres



- Specifications**
 Radiator length: Horizontal 26m or 30.5m
 Feedline: 50Ω coax cable
 Matching: Matching unit & transmatch
 Transmatch: Yes, needed
 Power Rating: 1500 Watts
 Rec. Height: 12m, usable at 9m

MT109 \$220 MT110 \$198

Carolina Beam 2

SUPER LOOP

80, 40, 20, 17, 15, 12, 10 Metres



- Specifications**
 Bands: 80 - 10 metres
 Polarisation: Both vertical & horizontal
 Radiator length: Horizontal 34.2m
 Feedline: 50Ω coax cable
 Matching: Matching unit & transmatch
 Transmatch: Yes, needed
 Power Rating: 1500 Watts
 Rec. Height: 12m

MT106 \$200

Super Loop

G5RV Plus

80, 40, 30, 20, 15, 10 Metres

- ✓ Computer Optimised
- ✓ #14 Hard-drawn copper antenna wire
- ✓ Glass-filled insulators
- ✓ Poly-coated Tuning Stub
- ✓ Coax Ses supplied for connectors

MT115 \$121

G5RV Plus antenna

Amateur Radio December 1994

Glasmaster On-glass antennas

- 144-148 430-450MHz
- 2.6dB gain @ 2m
- 6.3dB gain @ 70cm
- VSWR <1.5:1
- Power: 50 Watts
- Fid. tunable
- 4.3m RG-58 cable
- PL-259 plug fitted
- Modern black finish

GM270 \$119

- 144-148MHz
- 2.5dB gain
- VSWR <1.5:1
- Power: 50 Watts
- Fid. tunable
- 4.3m RG-58 cable
- PL-259 plug fitted
- Modern black finish

GM144 \$79.95

- Replacement whip for GM144 \$19.80
- Wh. p. base and remount kit \$49.80
- Replacement whip for GM270 \$23.80
- Whip, base and remount kit \$71.80
- Remount kit for either model \$17.50

5 Bands mobile

- 75, 40, 20, 15 & 10 metres
- 1.22m mast with 1/4-24 thread
- 40/75m easily tunable
- Resonators & top section included
- Parts available separately

AB5 \$239

HF Monoband whips

- Available for all HF bands
- 1.22m helical lower section with 1.22m stainless steel whip section
- Very economical
- Lightweight
- Strong fiberglass forms

Model	Band	Bandwidth	Price
PHF160	160m	180kHz	\$195
PHF75	75m	360kHz	\$80
PHF40	40m	80kHz	\$48
PHF30	30m	100kHz	\$48
PHF20	20m	150kHz	\$48
PHF17	17m	170kHz	\$48
PHF15	15m	200kHz	\$48
PHF12	12m	300kHz	\$48
PHF10	10m	500kHz	\$48
PHF6	6m	150kHz	\$48

1/4-24 antenna mounts



MM3401 \$120
Tapo mag. mnt.



VL-105AD \$12



VL-105ADT
Heavy duty mount \$15



VL-219
Bumper mount \$22



SS504
HD Spring \$22

The finest in Japan!

DIAMOND Antenna is one of the most respected names in Japan, with a huge range of HF, VHF and UHF mobile and base station antennas. Made only from the highest quality materials and finished to perfection DIAMOND is an antenna to be proud of!

DIAMOND ANTENNA

Model	Bands	Gain	Power	VSWR	Length	Radius Length	Weight	UHF D.O.	Price
Triple band base station antennas									
X7000	2m 70cm 23cm	8.5dB 11.7dB 13.7dB	100W 100W 60W						
X3000	2m 70cm 23cm	6.5dB 9.8dB 10.9dB	100W 100W 90W		3.05m	60cm	1.8kg		\$359
X5000	2m 70cm 23cm	4.5dB 8.5dB 11.7dB	100W 100W total	<1.5:1	1.8m	18cm	900g	30-42mm	\$299
X4000	2m 70cm 23cm	3.5dB 8.5dB 9.7dB	100W 100W total		1.3m	16cm	750g		\$279

Quad band base station antennas									
X700M	2m 70cm 23cm	8.5dB 11.7dB 13.7dB	200W		7.2m	52cm	5.8kg		\$599
X310M	2m 70cm 23cm	6.5dB 9.8dB 11.7dB	200W		5.2m	52cm	2kg		\$389
X310M	2m 70cm 23cm	6.5dB 9.8dB 11.7dB	200W		5.2m	52cm	2kg		\$389
X460	2m 70cm 23cm	7.5dB 11.0dB 10.9dB	200W total	<1.5:1	4.8m	52cm	2.2kg	30-42mm	\$299
X300	2m 70cm 23cm	6.5dB 9.8dB 9.8dB	200W		3.1m	52cm	1.9kg		\$249
X300	2m 70cm 23cm	6.5dB 9.8dB 9.8dB	200W		2.5m	52cm	1.2kg		\$229
X50	2m 70cm 23cm	4.5dB 7.0dB 7.0dB	200W		1.7m	18cm	900g		\$169
X30	2m 70cm 23cm	3.5dB 8.5dB 9.7dB	200W		1.3m	16cm	800g		\$149

Model	Bands	Gain	Power	VSWR	Length	Radius Length	Weight	UHF D.O.	Price
Single band GH series verticals									
GH28	28-30 MHz	3dB	10W PEP		5.1m	60cm	2.6kg		\$159
GH10	27-30 MHz	3dB	300W AM	<1.5:1	5.0m	60cm	8.6kg	30-42mm	\$149
GH8	30 MHz	6dB	200W PEP		6.3m	1.5m	0.7kg		\$199
GH6	30 MHz	3.4dB	200W PEP		0.4m	1.5m	1.8kg		\$148

Triple band GH20m/70cm vertical									
V2000	6m 70cm 23cm	2.5dB 8.5dB 8.4dB	150W	<1.5:1	2.5m	92cm	1.2kg	30-42mm	\$249

Model	Bands	Gain	Power	VSWR	Length	Weight	Price
N series mobile whips							
N407	23cm	8.4dB	50W				\$135
N510	2m 70cm	3dB 5.5dB	200W	<1.5:1	900mm	280g	\$119
N516	2m 70cm	2.5dB 7.2dB	120W		1.63m	500g	\$179

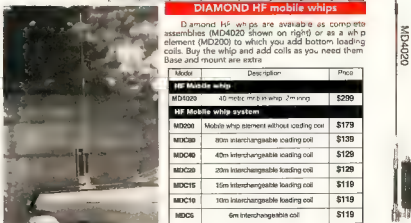
C/R series mobile whips (UHF base)							
CR827	6m 2m 70cm	2.15dB 4.5dB 7.2dB	120W total		1.5m	450g	\$169
CR1027	10m 2m 70cm	2.15dB 4.5dB 7.2dB	100W 100W 100W/70cm	<1.5:1	1.8m	450g	\$199
CR6	6m	2.15dB	200W			200g	\$89

GG series mobile whip							
GG4000	6m	2.15dB	200W	<1.5:1			\$129

DIAMOND HF mobile whips

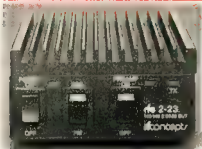
Diamond HF whips are available as complete assemblies (MD4020 shown on right) or as a whip element (MD200) to which you add bottom loading coils. Buy the whip and add coils as you need them. Base and mount are extra.

Model	Description	Price
HF Mobile whip		
MD4020	40 metre whip in whip 2m long	\$299
HF Mobile whip system		
MD200	Mobile whip element without loading coil	\$179
MDX30	30m interchangeable loading coil	\$139
MDX40	40m interchangeable loading coil	\$129
MDX20	20m interchangeable loading coil	\$129
MDX15	15m interchangeable loading coil	\$119
MDX10	10m interchangeable loading coil	\$119
MDX5	6m interchangeable coil	\$119



VHF/UHF Power Amplifiers

Compact HT power amplifiers



Two models, one for 2 metres (RFC-23) and one for 70cm (RFC-32) are designed as low cost power amplifiers for use with traditional 2 watt hand-held transceivers. These compact amplifiers are designed for SSB use as well as FM and so can be used with all mode portables or mobiles such as the Yaesu FT-290R and FT-790R etc.

RFC-23 2mtr 2-30W, with preamp **\$339**

RFC-32 70cm 2-20W, with preamp **\$450**

Dual band HT power amplifier

The 2/70G has two independent amplifiers, one for 2 metres and one for 70cm with band sensing circuitry to automatically select the band you are transmitting on.

Separate GaAs-FET preamps are provided for each band, so you get improved weak signal performance on both bands.

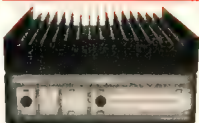
Frequency range: 144-148MHz
430-440MHz
Power input: 1 to 5 watts
Max input: 7 watts
Power output: 30W on 2 metres for 5W in
20W on 70 cm for 5W in
into 50Ω load, ALC limited
<6A @ 13.8V DC
226x129x52mm
BNC female

Current: 144-148MHz
Size: 430-440MHz
Connectors: 1 to 5 watts
Max input: 7 watts
Power output: 30W on 2 metres for 5W in
20W on 70 cm for 5W in
into 50Ω load, ALC limited
<6A @ 13.8V DC
226x129x52mm
BNC female

RFC 2/70G **\$555**
2m/70cm HT power amp

All Mirage and rfconcepts amplifiers have a full twelve month warranty with service carried out in Australia by Daycom.

High power dual band amplifier



The revolutionary new rfconcepts 2/70H amplifier is without question the most technologically advanced power amplifier on the market today.

ONE AMPLIFIER - The 2/70H isn't just two amplifiers in one box. It is a single amplifier using a dual RF-Power MOSFET device with a total of six broadband transformers for optimal matching over the entire frequency range.

TWO FILTERS - An amplifier of this power capability needs to have separate filters for each band. These are automatically selected in the 2/70H—don't worry, just transmit!

SWR PROTECTION - The 2/70H has a high performance dual-directional coupler in the output circuit which automatically calculates SWR, not just measures returned power. You can monitor output power or SWR on a front panel LED indicator.

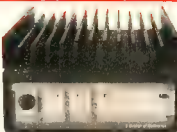
Frequency range: 144-148MHz, 430-440MHz
Power input: 20 to 50 watts (FM only)
Maximum input: 50 watts
Power output: 200W (2 metres) 125W (70 cm)
Current: <40A @ 13.8V DC
Size: 204x305x102mm
Weight: 5kg
Connectors: Type 'N' female

RFC 2/70H **\$1482**
2m/70cm High power amp

High power, all mode power amplifiers.



High power HT amplifiers



The rfconcepts VHF-160 is the perfect mate for your 2 metre hand-held radio. Given 1 to 8 watts input you get a full 60 watts of RF output power automatically. When operated with a dual-band hand-held, the VHF-160 automatically senses a 2-metre input and produces 60 watts. When 70 cm input is present the VHF-160 leaves the amplifier off, passing the signal directly to the antenna.

Frequency range: 144-148MHz
Power input: 1 to 8 watts
Maximum input: 8 watts
Power output: 60W into 50Ω oad,
A.C. lim tcd
Current: <14A @ 13.8V DC
Size: 127x229x74mm
Weight: 3.2kg
Connectors: SO-239 (UHF female)

RFC VHF-160 **\$510**
2M HT 60W power amp

The rfconcepts UHF-50 is the 70cm version of this amplifier. Designed to take 3 watts in and produce 50 watts out it has a lot of the same features as the VHF-160.

RFC UHF-50 **\$539**
70cm HT 50W power amp

RFC 2-315 **\$650**
2mtr 30-150W power amp

RFC 2-417 **\$650**
2mtr 45-170W power amp

RFC 4-110 **\$845**
70cm 10-100W power amp

RFC 4-310 **\$845**
70cm 30-100W power amp

MR-A1015G 6mtr 10-150W with preamp **\$807**

MR-A1035G 6mtr 10-350W with preamp **\$1355**

MR-B23 2mtr 2-30W no preamp **\$275**

MR-B23G 2mtr 2-30W with preamp **\$365**

MR-B215G 2mtr 2-150W with preamp **\$785**

MR-B108G 2mtr 10-80W with preamp **\$470**

MR-B1016G 2mtr 10-160W with preamp **\$785**

MR-B2516G 2mtr 25-160W with preamp **\$660**

MR-B5016G 2mtr 50-160W with preamp **\$660**

MR-B1030G 2mtr 10-300W with preamp **\$1425**

MR-B2530G 2mtr 25-300W with preamp **\$1425**

MR-B5030G 2mtr 50-300W with preamp **\$1390**

MR-B1060G 2mtr 10-600W with preamp **\$2270**

MR-B2560G 2mtr 25-600W with preamp **\$2270**

MR-B5060G 2mtr 50-600W with preamp **\$2270**

MR-D15N 70cm 1-15W no preamp **\$415**

MR-D26N 70cm 2-60W no preamp **\$585**

MR-D100ATVN 70cm 1-52W for ATV **\$860**

MR-D1010N 70cm 10-100W no preamp **\$860**

MR-D1010ATVN 70cm 10-100W for ATV **\$860**

MR-D3010N 70cm 30-100W no preamp **\$794**

Amplifiers marked * require 28V DC supplies, all 2 metre amplifiers have SO239 connectors, UHF types have 'N' connectors.

MIRAGE



Built in the USA to the highest standards, all Mirage amplifiers carry a full one year warranty from the factory with local service available. High power amplifiers are fitted with copper heat sink inserts. All Mirage amplifiers can be remote-controlled to permit mounting in a convenient location.

hy-gain[®] by Telex

Hy-Gain...the best made products for the radio amateur

Daycom is always trying to bring the best amateur products to Australia, which is why we have added Hy-Gain to our range this year. Rotators are in stock now and antennas will be added during the year. Please call for more details.



Hy-Gain AR40 - .28m²

For small common caten antennas up to .28m², the AR40 is an economic rotator using a d.c. brake and low voltage control. Ideal for medium size VHF/UHF arrays.

- Dual 12 ball bearing race
- Automatic point on sensor
- Fully automatic control
- Solid state control
- Low voltage operation
- Maximum mast size 52mm
- Includes lower mast support



Hy-Gain CD4511 - .79m²

The same external dimensions as the AR40 but heavier duty, the CD4511 will handle a 4 element tri-bander or that bigger VHF array with ease.

- Dual 48 ball bearing race
- Diecast ring gear
- Stamped steel gear drive system
- Illuminated directional indicator
- Snap action control switches
- Low voltage control
- Maximum mast size 52mm
- Includes lower mast support



Hy-Gain HAM IV - 1.4m²

Heavy duty antennas, such as large tribanders and big HF monobanders need a heavy duty rotator, like the HAM-IV with its wedge brake.

- New high strength ring gear
- Dual 96 ball bearing race
- Electric locking steel wedge brake
- Illuminated directional indicator
- Zenner regulated control circuit
- Snap action control switches
- Maximum mast size 52mm
- Lower mast support optional



Hy-Gain T7X Tailtwister - 1.9m²

For multiple HF antenna arrays or HF-VHF arrays the T7X Tailtwister has the grunt to handle the big jobs.

- Thickwalled castings for large load handling
- 138 ball bearings
- Triple bearing race
- Machined hardened steel drive gear
- Electric locking steel wedge brake
- Low voltage control
- Maximum mast size 52mm
- Lower mast support optional

AR40 rotator

\$503

CD4511 rotator

\$704

HAM-IV rotator

\$997

T7X Tailtwister rotator

\$1250

Mast bearings, mast clamps, cable and parts all available, please call for details!

Bench 1:1 balun



The Bench balun is a 1:1 matching device designed for feeding antennas needing a balanced feed from a coaxial cable. No ferrite core is used in this design so there is no saturation effect to cause TV. Even better the Bench balun is rated at 1.5kW continuous, 5kW peak, and is able to withstand significant mismatch without introducing distortion.

- Harmonic radiation on causing TV
- UV resistant case
- Heavy brass terminals
- Plated copper lugs
- Custom 'O' ring on connector
- No rusting parts

MT091 Bench 1:1 balun \$66

Outdoor balun-in-a-box

Use balanced line without the hassle of bringing it inside with the MF-912 balun box. Works with most tuners to feed any balanced line so you can still use ladder line. Mounts on wall or tower.



MFJ912
Outdoor balun

\$99

RADIO WORKS BALUNS



A 1:1 current mode balun rated at 1.5kW for dipoles, inverted-V's and trapped dipoles. Use on 80-10 metres. Stainless steel fittings.

MT113
BY 2K 1:1 balun **\$48**



A 4:1 current type balun with heavy duty 'X' core construction for loops, Delta loops, folded dipoles etc. on 80-10 metres. Our best 4:1 balun.

MT111
B4 20K 4:1 balun **\$87**



An economy 4:1 voltage type balun for loops, Delta loops, folded dipoles etc. on 80-10 metres or for low impedance 160 metre applications.

MT114
B4 2K 4:1 balun **\$67**



A high performance 4:1 balun for feeding open-wire line into the shack with coax. Withstands high SWR loads from antenna tuners.

MT112
New Remote **\$105**



The 1:1 balun designed for feeding Yagi. It has a 5kW power rating and excellent balance to help improve beam performance on 160-10M.

MT095
P1 5K 1:1 balun **\$67**

ANTENNA WIRE & SUPPORT ROPE

450Ω Open wire line

This is a window type ladder-line. Conductors are #18 CopperWeld wire. It is perfect for use in any application requiring a low loss open wire line. Colour: Black only.



MT3028
30m roll **\$36.00**

Get our wire antenna fact book
for more information on wire antennas, including insulators.

#14 Hard drawn Copper

This is the standard antenna wire. Standing a very tight, it is flexible, has a long service life, and is a easy to use. For all wire antennas up to 150h between supports.

WL001X100
30m roll **\$26.60**

WL001X150
60m roll **\$39.93**

#13 VARIFLEX insulated

Extremely tough jacket over a very flexible wire. About as stiff as hard-drawn strand wire. When insulated with a clear, in trees, for example. Resistant to acid rain and corrosive contaminants in the air.

WL002X150
45m roll **\$78.65**

Dacron rope

4.7mm MilSpec rope. This is a very special Dacron® polyester line that far outlasts Nylon line in typical amateur service. It has an outer abrasion resistant cover that is impregnated with a special chemical that resists the aging effects caused by the sun. The centre core is made of very strong solid braided Dacron®. The result is a long life support line that doesn't stretch. You cannot buy this type of support line at your hardware store, so we keep a stock on hand in 30 metre & 60 metre hauls.

WL004X100
30m haul **\$26.60**

WL004X200
60m haul **\$53.24**

Kantronics packet solutions

HostMaster-MAC

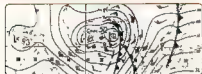
All the usual Macintosh interface features you would expect with all of the modes that a KAM+ can deliver. In fact HostMaster-MAC delivers more than many packet only programmes:

- ✓ Separate window for each connection with full split screen functions
- ✓ 10 buffers for EACH MODE
- ✓ PACTOR support for KAM+ and enhanced KAM
- ✓ Packet conferencing or round-table packet, even non-HostMaster users can join in.

ML072 HostMaster-MAC

\$95

SuperFax-II



Weather Facsimile (WEFAX) reception programme for Kantronics TNCs

- **Unattended** automatically detects, synchronises & saves picture to disk
- **Semi-unattended:** automatically detects start of picture, synchronises, receives picture to buffer
- **Manual mode:** synchronise incoming picture with function keys, capture incoming picture to buffer, turn buffer on/off, or save directly to disk
- **View from buffer or disk file**
- **Display black on white, or white on black**
- **Print captured picture to Epson or compatible graph cs printers & most 9 pin graphics printers.**
- **1200 ipm for weather or 40 ipm for wire photos.**
- **Split-screen terminal mode**
- **Supports CGA, EGA, VGA & Hercules graphics.**

Requires Kantronics KAM or KPC series using version 2.3 or later firmware

ML055 Superfax for IBM-PC

\$45

HostMasterII+



The Host MasterII+ terminal programme provides a great way to carry on a packet conversation (or several conversations) monitor what else is happening on the channel while keeping everything separate. Plus, with the KAM, work any HF mode at the same time.

The XmitEcho window shows characters as they are transmitted by an HF mode. What you receive from a mode other than packet, such as RTTY, ASCII, AMTOR or Pactor, displays in the **Non-Packet Receive Window**

- ✓ **Menu driven** from keyboard or mouse
- ✓ **10 buffers**, each sent with single keystroke
- ✓ **PACTOR** support for KAM+ & enhanced KAM
- ✓ **Reply** last line typed on each channel
- ✓ **Scroll back** in Monitor and Receive windows.
- ✓ **Supports up to 50 line VGA video**
- ✓ **Upload and Download** Binary or ASCII files. Each window can capture to its own separate file
- ✓ **Edit and save Receive Scrollback buffers**
- ✓ **Character Translations** supported separately for transmit and receive
- ✓ **Supports mouse, printer, COM ports 1-4**
- ✓ **Text Editor**, with cut and paste capability

ML060 HostMasterII+ for IBM-PC

\$110

Give your KAM 128K RAM, Pactor and now G-TORI!

The KAM Enhancement Board provides KAM owners with the same features as the new KAM PLUS. The Enhancement Board fits easily within the KAM case, plugging into the EPROM and RAM sockets. Many optional features for the KAM are now standard in the Enhancement Board

- G-Tor & Pactor
- on-board real-time clock
- battery-backed RAM

New hardware and firmware features have been added, most significantly, the expansion of RAM and EPROM space to 128K bytes. The enlarged RAM creates about 100K of personal mailbox space! The increased EPROM space makes possible additional firmware features and provides room for future expansion.

New hardware features:

- 128K bytes of RAM
- EPROM space expanded to 1 Megabyte
- Replaceable lithium cell for clock & RAM backup

New firmware additions:

- New-user and expert command sets
- Enhanced mailbox command set
- Extended RTTY & AMTOR character sets
- On-line help messages for each command
- Enhanced CW handshaking, weight-in, tone transmitted CW

ML030D KAM enhancement board **\$160**

Update your KAM+

See, it is out of date already? No, not really the folks at Kantronics just like making it better and better! Any KAM-Plus (or KAM with enhancement board) can be updated to include the latest HF mode, G-Tor, and all of the latest enhancements to the ever-popular Kantronics multi-mode controllers.

Update HostMasterII+

HostMasterII+ owners with version 3.0 or later can upgrade to version 3.3, the latest edition with full support for G-Tor and Pactor.

KANTRONICS - 5600 S. ALBANY - KANTRONICS

Kantronics Data Engine



The Kantronics Data Engine is built to keep pace with our changing times. For faster packet or experimentation and development, while remaining compatible with today's AX 25 system, a Data Engine is your answer.

You can install a second modem for dual port operation. Modems are also available with data rates up to 19,200 baud. G8BPQ Packet Switch firmware is also available.

- **EPROM** sockets for up to 1/2 MB of firmware
- **V40 processor** 10 MHz clock (PC compatible)
- Each port capable of >56 K baud, full or half duplex (depending on installed modems)
- **Install modems internally, or externally via back panel connectors**
- **Low power:** nominally 150 mA @ 12 VDC
- **Size** 45 x 150 x 225mm, Weight: 1.2kg

ML034 Data Engine only

\$669

ML034A DE with 1200bps modem

\$792

ML034M3 Modem developer's kit

\$45

ML034M4 Firmware developer's kit

\$45

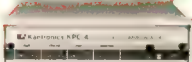
ML036 DE 1200bps modem

\$172

ML038 DE 9600/19k2 bps modem

\$212

KPC-4 Dual-port Packet Controller



The KPC-4 is a Packet Communicator with two radio ports and two modems. You can operate from both ports at the same time, and if desired provide a gateway between them.

Most commands have dual-port settings allowing you to adjust each port to the characteristics of the attached radio and operating conditions.

- **Software Carrier Detect** — you can run open squelch and detect weaker signals
- **Personal Packet Mailbox (PBBS)** features programmable size, reverse forwarding, To field editing, mail-waiting indicator
- **Automatically transfer** connects to PBBS.
- **Host Mode** for HOSTMASTER software
- **Weather Facsimile** reception with optional programme
- **Full duplex capability**
- **KISS mode** for TCP/IP or BBBS use
- **Baud rates:** 1200, 600, 400, 300
- **32K RAM**
- **Supports up to 26 packet connections** (streams).
- **Size:** 45 x 150 x 200mm, 1.2kg
- **Requires 12 VDC at < 250 mA**
- **Optional SmartWatch** — Stores PBBS messages, and keeps date and time when unit is turned off

ML032 KPC-4 dual port packet TNC **\$599**

Kantronics WeatherNode



The Kantronics WeatherNode collects data from attached sensors and stores it in battery-backed RAM, which can then be accessed via a packet radio or telephone modem. To request information from the WeatherNode, you simply connect, and request information with the Data command.

The WeatherNode connects to the serial port of your TNC, and may also be connected to your computer serial port. Front panel switches allow three modes of operation, local, remote or bypass. The Bypass mode bypasses the WeatherNode completely and allows you to use your TNC normally.

- **External & internal temperature sensors** supplied
- **Temperature read** $\pm 1^\circ\text{C}$ or 1°F
- **Data command** retrieves only the information you want.
- **Password protected** remote access
- **Connects to any TNC**
- **RS-232 or TTL levels** selected by internal jumper
- **Accepts up to seven sensors**
- **Size:** 45 x 152 x 203mm, 1kg
- **Power Requirements:** 11-20 VDC, <45 mA

ML043A WeatherNode **\$642.00**

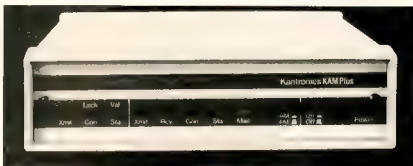
ML043S3 Anemometer **\$244.20**

ML043S2 Rain gauge **\$190.80**

multi-mode mastery – Kantronics

- ★ Dual Ports
- ★ HF & VHF Packet
- ★ AMTOR Modes A & B
- ★ AMTEX / NAVTEX
- ★ RTTY (Baudot & ASCII)
- ★ CW (5-99 WPM)
- ★ Sophisticated PBBS
- ★ Can use different modes on VHF and HF simultaneously!

\$729 Stock No. **ML030E**
 Freight \$15



Two Radio Ports, Two Modems

The KAM+ has two radio ports, one especially for HF modes and one for VHF packet. Both ports can be used simultaneously, allowing you to operate packet from both ports at the same time, or provide a packet gateway between the two ports. If you are using the HF port for a mode other than packet, your VHF port can still be operated with your packet mailbox, digipeater, and KA-mode functions. If you are using a Host Mode terminal programme, you can simultaneously work VHF packet and any HF mode. Amtor & Pactor users have access to the same mailbox via VHF packet users.

Modes

The VHF port is used for 1200 baud packet, and reception of weather facsimile (WEFAX) when used with an HF radio.

The HF port supports 50 to 300 baud packet, 20 to 500 baud RTTY/ASCII, Amtor Mode A (ARQ) and Mode B (FEC or SE-FEC), G-Tor, Pactor, Navtex/Amtex message formats: preprogrammed 170, 425 and 850 Hz shift, plus user definable mark and space tones; as well as 5 - 99 words per minute CW with Farnsworth mode.

The KAM+ also supports a personal packet mailbox accessible from both ports and from Amtor as well as Packet modes. KISS mode for high level protocols such as TCP/IP works in multi-drop mode. Host mode for enhanced terminal programmes. KA-Node (similar to Net/Rom) for links which are more reliable than digipeating. You can also set up a Gateway or KA-Node between the two ports.

- ★ Software Carrier Detect – run open squelch and detect weaker signals
- ★ Full duplex capability on VHF port
- ★ Large bargraph tuning indicator for easy HF tuning
- ★ AMTOR – provides for 7 or 9 char SELCALLS, re-linking, and compatibility with 4 char operation
- ★ CW – Selectable bandwidth and centre frequency
- ★ NAVTEX / AMTEX – Using AMTEX mode you can copy ARRL bulletins.
- ★ RTTY / ASCII – User definable mark & space tones.

- ★ Personal Packet and Amtor/Pactor/G-Tor Mailbox (PBBS): features: programmable size now up to 500K bytes, reverse forwarding, TNC field editing, mail-waiting indicator
- ★ Automatically transfer connects to PBBS
- ★ Host Mode support for simultaneous VHF packet and any HF mode
- ★ Weather Facsimile (WEFAX) reception with optional programme
- ★ Battery-backed RAM and Clock built-in
- ★ 128K RAM with option to 512K
- ★ Reliable, fast acting AGC eliminates the need for a manual threshold adjustment
- ★ Size: 45 x 150 x 225mm, 1.2kg
- ★ Requires 12 VDC at < 300 mA

Options

- ★ Terminal and Wefax programmes for PC compatibles, Macintosh and Commodore C64/128
- ★ Host Master terminal programmes provide capability to simultaneously work VHF packet and any HF mode (for PC, C64 or Macintosh)

Kantronics KPC-3



The high performance, low power, small sized TNC. This TNC for both new and experienced users features a dual-level command set with 23 and 1380 commands respectively and incorporates the Kantronics full-featured PBBS system.

The KPC-3 and KPC-9612 are Kantronics answers to the high costs, high power consumption and lack of features of some manufacturers. These packet controllers are suitable for portable and emergency operation as well as having a lot of the features you need for home operation.

- ★ New-user mode for simple installation and set-up
- ★ Two comprehensive and easy to read manuals make installation and operation truly easy
- ★ Has HOST MODE for HostMaster software
- ★ Complete with KISS mode, KA-NODE and Wefax, just like all the 'big' TNCs!
- ★ PBBS works just like WORLDBBS system!

ML073 KPC-3 packet controller \$279
ML073B Real-time clock option kit \$35

- ★ Full featured mailbox with easily expandable memory for up to 512K mailbox memory
- ★ Lithium battery back-up for static RAM
- ★ Remote access with password protection
- ★ Room for user-installed 9V battery
- ★ Operates on 6-20V DC @ <20mA (KPC-3) 6-20V DC @ <40mA (KPC-9612)
- ★ Software command to turn LEDs off for even lower power consumption
- ★ Measures only 130mm wide, 20 high and 130 deep, weighs <500g
- ★ Supplied with PACTERM software for IBM-PC, optional HostMaster software for IBM-PC, Macintosh and Commodore-64 computers.
- ★ Optional cables available for easy installation
- ★ 100% designed and manufactured in the U.S.A. for the highest quality and reliability
- ★ Full 12 month warranty

Kantronics KPC-9612



Full dual port performance at both 9600 baud and 1200 baud with cross-port gateway and digipeating, enough to make the competition weep! The KPC-9612 has all of the features of the KPC-3 and a whole lot more!

The KPC-9612 combines the features of the KPC-3 with a new 9600 baud modem designed for ease of setup and low power operation.

With the KPC-9612 Kantronics have also added several control lines in each port so that you can control relays or radios with ease from your packet software. Fully remotely controllable with password protection. Supplied as standard with 32K of RAM.

KPC-9612 specific features:

- ★ Easily adjusted output levels
- ★ Simple to adjust equaliser
- ★ Cross port gateway
- ★ Dual port mailbox
- ★ Cross port digipeating
- ★ Ideal for PACSAT operation at 9600 baud
- ★ Multi-drop KISS for ease of use with NOS

ML074 KPC-9612 packet controller \$535

Savant packet software (Macintosh)

- ★ Animated icons show channel status
- ★ Status bar shows channel information
- ★ Open as many concurrent connections as you want
- ★ System 7 compatible, 32 bit clean
- ★ Works with any KISS capable TNC

Savant software for the MAC is the best we have found for packet use. A simple and intuitive to use programme, Savant has the features you could want. Works with AEA, DRSI, PacComm, MFJ or Kantronics TNCs in KISS mode.

BX468
 Savant software

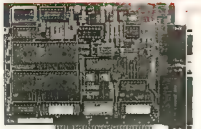
\$79

Savant!
 Software for the Macintosh will work with all Kantronics, DRSI, MFJ or other packet equipment using KISS mode!



DRSI

PC Packet adapters



Enjoy packet without the need for TNCs cluttering up the place! The DRSI PC Packet Adapter is the ideal way to get or packet without losing COM ports on your computer, especially if you are running a BBS or network system. All DRSI PC Packet Adapters have two separate output ports allowing them to use one or two radios. The three types differ in the configuration of the modems on the card and those supported externally.

PC Packet Adapter Type 1.

The basic type with one on-board 1200 bps AF5K modem for VHF/UHF use and provision for one external modem. The second port can be connected to an HF modem or a high speed modem. Options DCD card can be fitted.

ML005 DRSI type 1 card \$299

PC Packet Adapter Type 2.

The type 2 adapter has two 1200 bps modems for BBS and more sophisticated applications. Both ports may have DCD cards fitted.

ML005 DRSI type 2 card \$363

HF Modem

For use with type 1 cards, the DRSI HF modem offers superior performance. Power is derived from the PC Packet Adapter but the modem can be placed with the HF radio for ease of tuning and use.

ML009 HF modem \$171

DRSI Packet TNCs

The DRSI DPK-2 revolutionizes the state of the art in TAPR TNC-2 compatible packet controllers. It is a compact, low power, ALL CMOS design with 100% TNC-2 firmware compatibility and runs ROSE or NET/ROM. Comes with version 1.1.8a TAPR firmware, enhanced with the DRSI Personal Message System (PMS).



- * TNC-2 compatible 1200 bps TNC
- * Optional HF modem (ML009)
- * Runs ROSE & NET/ROM firmware
- * Includes packet 5.1 software
- * Personal Message System
- * Battery-backed RAM
- * Power required <40mA @ 12VDC
- * No-tune crystal-locked modem
- * Quality American made

ML006 DRSI DPK-2 TNC \$279

Low cost 9600bps at last!

The DRSI DPK-9600 takes the technology of high speed packet one step closer to the plug-and-play goal we have been working for. For the first time assembling a 9600bps system can be as most as simple as getting a 1200bps system on air.



The DRSI DPK-9600 is the ideal TNC for high speed packet radio. A single chip 9600 baud modem combined with a custom programmable logic device to produce a TNC which is 100% compatible with the G3RUH and K9NG modem designs.

Modem is jumper selectable for 4800, 9600 and 19.200bps speeds with serial port speeds of up to 38.4kbps. Uses any TAPR TNC-2 compatible firmware without modification.

- * TNC-2 compatible high speed TNC
- * Jumper-selectable speeds
- * Runs ROSE & NET/ROM firmware
- * Includes packet 5.1 software
- * Personal Message System
- * Battery-backed RAM
- * Power required <40mA @ 12VDC
- * Radio modification details supplied
- * Quality American made

ML010 DRSI DPK-9600 TNC \$459

Fastw Packet!



High speed options and TNCs

All MFJ controllers are available with the 2400 baud modem fitted for easy operation of 300, 1200 & 2400 bps packet. You can order the controller factory modified with the TURBO option fitted by using the following model numbers.

MFJ1278BT 2400 bps MFJ1278B \$799

MFJ1270CT 2400 bps MFJ1270C \$429

MFJ1276T 2400 bps MFJ1276 \$519

Any MFJ TNC, and most types from other manufacturers which have a standard modem disconnect header, can be fitted with the MFJ2400 2400 bps QPSK modem.

MFJ2400 2400bps for MFJ TNCs \$200

MFJ2400X 2400bps for PK-232 \$200

The MFJ9600 is a 9600bps modem compatible with the G3RUH design and compatible with the 9600 baud products manufactured by PacComm, DRSI and Kantronics.

MFJ9600 9600bps modem card \$245

You can also order any MFJ TNC with a 9600 baud modem fitted.

MFJ1278BQ 9600 bps MFJ1278B \$829

MFJ1270CQ 9600 bps MFJ1270C \$459

MFJ1276CQ 9600 bps MFJ1276C \$549

Note: Not all radios are compatible with 9600 baud operation.

DAYCOM, Australia's leading packet supplier, can fit you out with the best in high speed packet and memory expansion options.

Our showroom has all of the latest packet equipment on display, just waiting for you to try it on air, whilst our workshop is uniquely equipped to sort out your interconnection and set-up problems. If you need assistance, just call.

Upgrade your existing MFJ1278!

If you already have an MFJ1278 or MFJ1276, you can upgrade your existing multi-mode controller to have most of the features of the MFJ1278B. You will have FACTOR, enhanced mailbox and with the latest Multicom upgrade you get a of the colour SSTV features and ease of use of the new MFJ1278B.

MFJ56A upgrade with 32K RAM \$160

MFJ56B upgrade with 128K RAM \$200

MFJ56C upgrade with 512K RAM \$500

Memory Expansion

For expanding MFJ1278B, MFJ1270C, MFJ1276, KPC-3 or KAM-9 controllers order these kits.

MFJ45A 32K RAM chip kit \$16

MFJ45B 128K RAM chip kit \$30

MFJ45C 512K RAM chip kit \$400

Packet Connecting cables

Radio Type	TNC Type			
	MFJ DRSI PacComm	AEA PK232	AEA PK88	Kantronics HF Kantronics VHF
Icom/Yaesu Handheld	MFJ5024	MFJ5024X	MFJ5024Z	MFJ5024YV
Kenwood Handheld	MFJ5026	MFJ5026X	MFJ5026Z	MFJ5026YV
Yaesu 8 pin radios	MFJ5080	MFJ5080X	MFJ5080Z	MFJ5080YV
Icom 8 pin radios	MFJ5084	MFJ5084X	MFJ5084Z	MFJ5084YV
Kenwood/Alicco 8 pin radios	MFJ5086	MFJ5086X	MFJ5086Z	MFJ5086YV

MFJ packet cables all types listed above \$37.50

MIC/TNC SWITCH



MFJ1272B \$87.00

for MFJ/DRS TNCs

MFJ1272BX \$99.00

for AEA PK-232

MFJ1272BYH \$99.00

for KAM HF port

MFJ1272BYV \$99.00

for Kantronics VHF port

MFJ1272BZ \$99.00

for AEA PK-88

MFJ1272M \$87.00

for MFJ/DRS TNC to RJ45

MFJ1272MX \$99.00

for AEA PK-232 to RJ45

MFJ1272MYV \$99.00

for Kantronics VHF port

MFJ1272MZ \$99.00

for AEA PK-88

MFJ1278B & Multicom give you FAX, SSTV and WEFAX too!



MFJ1289 Multicom software gives you easy to use menu-based operation of all 10 modes of the MFJ1278B (or older MFJ1278A) Packet, Factor, Amtor, 16 grey level FAX, B+W or Colour SSTV, RTTY, ASCII, CW, Navtex and a full featured Contest Memory Keyer.

High Resolution FAX

You can see up-to-date weather information right on your screen, as well as photo FAX from AP and UPI as well as others. The MFJ1278B and Multicom will transmit as well as receive in FAX mode.

Colour SSTV

MFJ's Multicom can use a PCX format graphic file as an SSTV picture to be sent and will save incoming pictures in this format for later use. Now you can use all of the features of your new graphics packages on the PC to generate exciting SSTV pictures.

MFJ1289

Advanced software system

\$110

SOFTWARE

MFJ software supports the features of the MFJ digital data controllers on a range of computers.

MFJ1284 Basic pack for IBM-PC All basic features but no grey scale FAX or SSTV **\$49.95**

MFJ1287 Starter pack for Apple Mac. Basic features, no grey scale operation, but has FAX **\$49.95**

MFJ1288 MULTICOM for Commodore C64/128 latest version with lots of new features **\$79.95**

MFJ1283 Basic C pack (type) for VIC 20 A simple terminal programme **\$49.95**

MFJ1288 Packet picture software. Can be used with any packet hardware for packet pictures. **\$19.95**

MFJ1290 Multicom for Commodore Amiga, fully featured all mode software **\$79.95**

MEJ Packet & multimode controllers

MFJ1278B — our most popular multimode!



Only the MFJ1278B brings you the widest possible selection of modes, 10 in all including Factor, Amtor, Colour SSTV, 16 level FAX, Packet, RTTY, ASCII, Navtex, CW and memory keyer, all in one box and easy to use!

But for 1995 MFJ makes the MFJ1278B even easier to use with two new options.

- Internal real-time clock
- To keep you on time all the time, and
- Scope tuning adaptor—which allows you to use an oscilloscope with the MFJ1278B to correctly and easily tune RTTY and other signals.

MFJ1278B

Multimode with Factor

MFJ43 Real time clock

MFJ44 Scope tuning indicator

\$649

\$58

\$78

- ★ New **FACTOR** mode
- ★ 32k bytes **enhanced** packet mailbox expandable to 128k or 512k bytes.
- ★ Auto forward and reverse forwarding of mail
- ★ Mailbox sysop paging and chat mode.
- ★ New **COLOUR SSTV** functions (with Multicom software)
- ★ Transmit and receive colour SSTV in Robot, Scotty and Martin formats
- ★ 16 grey levels for FAX and SSTV
- ★ Dramatically improved Automatic Signal Analysis
- ★ 19,200 baud terminal data rate.
- ★ 1 megabit EPROM for future expansion
- ★ 2400 and 9600bps modems available.

MFJ HF/VHF Packet Radio controllers



Thousands of these robust, basic TNCs are in use all around the world by individual amateurs as well as in digipeaters and bulletin board systems. You get the full TAPR TNC-2 with many MFJ exclusive enhancements which combine to give the MFJ1270C the reputation of being the most reliable TNCs in the world today.

Now the new MFJ1270C has built-in provision for memory expansion, EPROM expansion and terminal baud rates up to 19.2kbps. The ON/OFF switch has been moved to the front panel and a monitor amplifier

has been added. HF DCD circuitry has also been enhanced. Surely this is the best value in town for packet only use!

Designed to operate from 12V DC (power supply not included) the MFJ TNCs have RS-232 and TTL serial (for Commodore 64) interfaces as well as software to support IBM-PCs, Apple MACs and Commodore C64 and 128.

MFJ1270C

1200bps VHF/UHF

\$259

Packet plus FACTOR TNC



Now you can have all of the features of the MFJ1270C, the most reliable packet TNC in the world, plus FACTOR, precision tuning indicator for HF and an extra 32K of memory for your packet mailbox.

FACTOR is an exciting new HF mode which combines the best features of Packet and Amtor plus new innovations. It gives impressive weak signal performance, error correction, higher baud rates, data com-

pression and full 8 bit data transmission.

The MFJ1276 has a precision 20 JED tuning indicator, plus all of the necessary features for both HF and VHF packet operation.

MFJ1276

Packet/Factor TNC

\$349

MFJ Deluxe hybrid phone patch



MFJ624D

Deluxe hybrid phone patch

\$225

MFJ's Deluxe hybrid phone patch, the MFJ624D is designed to give you crisp, clear, hum free audio, and that is what phone patching is all about. It is pre-wired for Kenwood, ICOM, Yaesu and Alinco radios, or others using standard 8 pin microphone connectors.

You have the option of using either VOX or Push to Talk. Pi-network RF filters and PC board construction help to eliminate RF feedback into the patch unit. You can use the MFJ624D with virtually any rig.

Built-in VU meter monitors phone line levels to prevent cross talk. Adjustable multi-depth provides the greatest possible isolation between transmitter and receiver, in fact there are separate gain controls for transmit and receive audio to eliminate the need to repeatedly make adjustments before and after using the patch. Phone line connections use standard 'modular' phone jacks. Jacks provided for speaker, audio in and audio out. Uses 12V DC (power supply not included) or 9V transistor radio type battery.

This American made phone patch will give you more quality and more features than patches costing many times more.

This item is not approved for direct connection to Telecom Australia lines.

CLOCKS

MFJ112 - World time clock

Not only shows you the time at any QTH throughout the world, it also gives you an attractive world map so you can see the place where your contact is! Displays hours, minutes, seconds, use selectable daylight saving time feature, push buttons allow you to move east or west and a flashing map segment shows the time zone. Great gift idea!



MFJ112 DXers World Clock

\$62.50

MFJ105 24 hour wall clock

Powered by a single 'AA' size battery the MFJ105B is a true 24 hour wall clock with a 250mm diameter face. Ideal as a station clock, it offers excellent readability across the room!



MFJ105B 250mm 24 hour clock

\$49.88

Read both UTC and local time with the convenient MFJ105B dual time clock. One unit is 24 hour for UTC, the other 12 hour for local time. Or you can choose the MFJ107B a night 24 hour clock.



Mounted in a brushed aluminium frame these clocks feature huge 16mm characters, long life battery included.



MFJ107B 24 hour LCD clock

\$24.88

MFJ108B Dual LCD clock

\$49.88

FAX, WeFAX, RTTY & CW with AMIGA



With the NEW MFJ1214 you will be able to use your radio to receive and transmit brilliant, full colour news photographs, incredible WeFAX maps and RTTY. With easy to use menu driven software, comprehensive manuals and the now famous MFJ JumpStart guide you will be enjoying your radio even more than ever!

The MFJ1214 is a combination software and hardware package for specific computers. Presently, versions are available for the IBM-PC and compatibles and the Commodore AMIGA. It is hoped that versions for the Macintosh and other computers will be available soon. Everything you need is included; you don't need to buy any other software to get going and the only hardware you need is a connector to suit your radio.

Enjoy RTTY, including news broadcasts, ASCII,

WeFAX for weather maps and FAX for all sorts of news service photographs as well as amateur radio operators sending FAX messages to each other.

The MFJ1214 offers 16 levels of grey scale for really top quality FAX and WeFAX images. There is even a built-in timer function allowing you to begin automatic receipt of weather maps, which can then be saved to disk automatically, printed on your printer or both if you wish.

VERSATILE ZOOM FEATURE allows the selection and enlargement of areas of the images for close inspection of detail.

- ✶ 16 level grey scale
- ✶ Full colour FAX photos, up to 32,000 colours
- ✶ RTTY with on screen tuning indicator
- ✶ RTTY text editor but t-on
- ✶ Save text or images to disk or display them on your choice!
- ✶ CW regeneration for cleaner signals
- ✶ CW keyboard mode for effortless CW sending
- ✶ Software and cables included for either IBM-PC or Amiga computers.

MFJ1214PC for IBM-PC

\$345

MFJ1214AM for Commodore Amiga

\$345

DC Multiple outlet boxes



MFJ1116 - Eight pairs of binding posts with switch, fuse and Ammeter. Every shack needs one!

MFJ1116 Deluxe DC outlets

\$112.00

MFJ1118 - Our biggest DC outlet unit. Handles a total of 35A. You can power two HF or VHF rigs through two pairs of 30A binding post terminals, each pair is individually fused. Five pairs of terminals, with a fuse and master switch, are provided for powering accessories, with a 15A maximum current capacity.

MFJ1112 - Six pairs of binding posts for general purpose 12V distribution. RF bypassing fitted to keep your DC lines clean.

MFJ1112 DC outlets

\$74.88

Supplied with 6 feet of 8 gauge cable with ring terminals attached.

MFJ1118 DC outlets

\$162

SPEAKER MICROPHONES

Compact Size

MFJ's speaker microphone lets you carry your hand held safely on your belt yet still monitor and talk with convenience. These microphones have quality electret inserts and wide range speakers for superb audio on both transmit and receive.

Earphone jack is provided on plug.

MFJ283 Alinco (split jacks)

\$62.50

MFJ284 Icom or Yaesu

\$62.50

MFJ286 Kenwood

\$62.50

Tiny size

MFJ's Tiny-sized speaker microphones give you all the features in a tiny package. High quality electret inserts and wide range speakers give superb audio quality. Each mike has an earphone jack on the microphone, an indicator LED for PTT and a swivelling lapel/pocket clip and MFJ's unconditional one year warranty in a package only 50 x 32 x 6.5mm.

MFJ285 Icom, Yaesu, Alinco

\$62.50

MFJ285W W2A & SRA series Icom

\$62.50

MFJ285L with right angle connector

\$62.50

MFJ287 Kenwood

\$62.50

MFJ287L with right angle connector

\$62.50

Audio Processing

Timewave DSP-9



Timewave DSP-9+



Timewave DSP-59+



- ✓ Reduce noise & interference
Adaptive noise filter for SSB & AM
- ✓ Eliminate heterodynes
Multiple automatic notch filters
- ✓ Sharp Speech and CW filters
Linear phase FIR (finite impulse response) filters, one set for SSB, another for CW... 1.8, 2.4, & 3.1 kHz Bandpass (SSB) 100, 200 Hz & 500 Hz Bandpass (CW)

Digital signal processing is the latest revolution to hit the amateur radio scene. Properly implemented digital signal processing has the ability to enhance the performance of YOUR station. With the Timewave Technology third-generation DSP systems you get superior performance at remarkably low cost. CW filters as narrow as 100Hz that don't ring, amazingly effective heterodyne elimination and with the DSP-59+ a range of filter combinations that should cope with just about any situation, and a random noise reduction capability which really works.

DSP-9 DSP signal processor

\$339

- ✓ Reduce noise & interference
Adaptive noise filter for SSB & AM
- ✓ Eliminate heterodynes
Multiple automatic notch filters
- ✓ Sharp Speech and CW filters
Linear phase FIR (finite impulse response) filters, one set for SSB, another for CW... 1.6, 2.0, & 2.4 kHz Bandpass (SSB) 100, 200 Hz & 500 Hz Bandpass (CW)
- ✓ Programmable CW centre frequencies
400, 500, 600 or 800Hz
- ✓ HF Data filters
For HF Packet, PACTOR, G-Tor, AMTOR and RTTY with programmable centre frequencies.
- ✓ Switchable AGC

The Timewave DSP-9+ adds HF digital mode filter options to the DSP-9 and incorporates switchable AGC and selectable centre frequency combinations not provided for in the DSP-9.

DSP-9+ DSP signal processor

\$449

- ✓ Reduce noise & interference
Adaptive noise filter for SSB & AM
- ✓ Eliminate heterodynes
Multiple automatic notch filters
- ✓ Sharp Speech and CW filters
SSB, HPF 200Hz-1.6kHz, LPF 1.7kHz-3.1kHz
- ✓ Programmable CW centre frequencies
Centre frequencies: 400Hz-1.0kHz Bandwidths: 25-600Hz
- ✓ HF Data filters
For HF Packet, PACTOR, G-Tor, AMTOR and RTTY, SSTV, WEFAK and FAX as well as weak signal EME and VHF signals.
- ✓ Switchable AGC

The Timewave DSP-59+ offers the most flexible array of filters in the range as well as a series of programmable options to suit just about any need. Great for SWLs as well as the amateur who is really serious about working the weak signal DX stations.

DSP-59+ Advanced DSP signal processor

\$629

MFJ432 Voice Keyer

Gain an unfair advantage during a contest by cloning your voice!



buttons and still have your voice after the contest. You can store four natural sounding messages in a total of 20 seconds. EEPROM technology keeps messages stored for up to 10 years — no backup battery needed.

You can also repeat a message continuously. It makes it sooooo easy to call long CQs during poor band conditions. It's easy to use — just plug your 8 pin microphone cable into the MFJ-432 and plug its cable into your transceiver's 8 pin mic connector. Internal jumpers let you customize it to your rig.

Built-in speaker lets you monitor stored messages. Has jack for remote control operation. Uses 9 volt battery (not included) or external DC supply.

MFJ432 Voice keyer

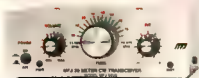
\$219

Store frequently used phrases like "CQ Contest this is VK3ND", "You're 59", "QTH is Melbourne". With the new MFJ Voice Memory Keyer™ call CQ, send your call and do contest exchanges for you in your own natural voice.

Operate most of a contest by pressing a few

HF QRP CW Transceiver

- ✓ SW semi-break in CW transceiver
- ✓ Models for 15, 17, 20, 30, 40 metres
- ✓ High performance superhet receiver
- ✓ 6 pole crystal filter
- ✓ R.T. and vernier tuning
- ✓ Automatic Gain Control
- ✓ Built-in sidetone generator
- ✓ Optional built-in Curtis chip keyer
- ✓ Optional narrow audio filter



MFJ9000 series QRP transceivers

\$399

MFJ9420 20mtr SSB Transceiver

- ✓ 12W PEP output
- ✓ Simple operation: no microprocessors!
- ✓ RF speech processing
- ✓ 8 pole crystal filter
- ✓ Covers 14.150-14.350MHz
- ✓ Automatic Gain Control
- ✓ Dynamic microphone included
- ✓ Optional CW adaptor adds 'low end' of band coverage
- ✓ Range of accessories available



MFJ9420X 12W transceiver with mic

\$519



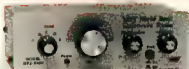
The MFJ super DSP Filter automatically eliminates heterodynes, reduces noise and interference simultaneously on SSB, AM, CW packet, AMTOR, PACTOR, RTTY, SSTV, WEFAK and FAX as well as weak signal EME and VHF signals.

- ✓ Reduce noise & interference
Adaptive noise filter for SSB & AM
- ✓ Eliminate heterodynes
Multiple automatic notch filters
- ✓ Sixteen preset filters
Use these or programme your own.
- ✓ Tunable high pass & low pass filters
HPF 200Hz-2.2kHz LPF 1.6-3.4kHz
- ✓ Programmable CW centre frequencies
Centre frequencies: 300Hz-3.4kHz Bandwidths: 50-680Hz

MFJ784 DSP signal processor

\$499

MFJ Short Wave receiver kit



Remember hunching over your regenerative receiver for hours with a pair of phones pressing uncomfortably against your ears? Did you ever wish you could relieve some of that excitement?

This little beauty performs — it has an RF amplifier stage and it goes into regeneration smoothly without pops or dead spots. Covers the popular shortwave and amateur bands. Can be operated from a 9V internal battery. Has two headphone outlets for 'Walkman' type headphones.

MFJ8100K SW receiver kit

\$135

Keyers & code practice

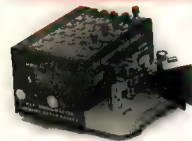
MFJ's MORSE-MASTER Menu driven memory keyers!



MFJ's MORSE-MASTER is so easy to use you may never read the manual! Its unique menu system allows you to control absolutely every feature of this amazing Memory Keyer. From the menus you can

- Save and play messages
- Set starting serial number
- Decrement serial numbers
- Set speed, weight & sidetone
- Use iambic, semi-auto or handkey modes
- Turn sidetone on & off
- Tune transmitter
- But in sidetone speaker with tone adjustable from 300-3000Hz
- Compensates for transmitter keying characteristics
- Keying output can be turned off for practice
- Memory can be expanded to 8000 characters

Piggyback a MORSE MASTER onto a BENCHER iambic key



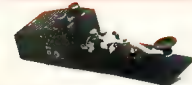
Truly the best of all CW worlds — all of the features of the MFJ492 MORSE MASTER Keyer (with the exception of remote control and memory expansion) in a compact configuration that mounts onto a Benchner iambic paddle. You can buy either the complete combination or just the keyer for your Benchner, whatever you like.

You get all the features of the MFJ492 including message memories, Morse trainer, sidetone, automatic serial numbering and much, much more! Use 9V battery (not included) or 12-15V DC power supply.

MFJ490 Keyer and Key **\$375**

MFJ490X Keyer only for Benchner **\$248**

Deluxe Code Practice Oscillator



The MFJ557 Deluxe code practice set features a standard Morse key on a heavy non-skid steel base. The MFJ557 sets your practice code wherever you are, and it is powered by a 9V battery (not included) or an external DC source, it's easy to use wherever you go. A volume control is provided to permit adjustment to a comfortable listening level. A tone control permits you to adjust the frequency and for privacy you can plug in an ear-piece, or for classroom situations you can plug in an extension speaker.

Measures 216 x 57 x 95mm. Finish is all black.

MFJ557 Code practice oscillator set **\$84.10**

Smooth speed control is possible from 5 to 100 WPM using the AnalogSet mode where the paddle is used to vary the speed.

MESSAGE SYSTEM

Built-in editing system allows corrections without re-entering the entire message. You can chain messages together or send them separately. You can even interrupt a message whilst it is being sent and then resume the message!

Message sequences can be repeated with pauses, so you can send CQ, interrupt to listen for a replay and recommence calling CQ with just one button. You can even insert commands for the keyer into the messages so that you can customise serial number exchanges and automatically increment numbers with just a single button push.

POWERFUL MORSE TRAINER

With both Farnsworth and normal timing the MFJ MORSE-MASTER lets you use the common 5 character group method as well as random 1 to 8 character groups for code practice and training. You can even create a practice session in memory then play it back later — truly amazing! Uses 9V battery (not supplied) or external 12V DC supply.

MFJ492 MORSE MASTER Keyer **\$225**

Deluxe Electronic Keyer



The MFJ407C Deluxe Electronic Keyer can be used with a straight key, a single lever or dual lever paddle with type A or B iambic keying for sending high quality Morse code. Full iambic keying with a dual lever paddle, dot-dash insertion, semi-automatic dots and manual dashes, dot-dash memory, self-completing dots and dashes, jam proof spacing and instant start keying.

Speed, weight, tone and volume controls are all on the front panel as well as ON/OFF, tune and semi-auto/auto switches. The weight control will provide negative as well as positive weighting.

The MFJ407C has a built-in speaker and uses a 9V battery (not included) or an external DC source, enclosed in a black aluminium cabinet measuring 178 x 51 x 150mm.

MFJ407C Deluxe electronic keyer **\$155**

MFJ Stand alone MORSE KEYBOARDS



The MFJ451 stand-alone keyboard has a 200 character type-ahead buffer and two 100 character message memories. With all functions controlled from the keyboard sending Morse Code has never been easier, or more fun.

Super CW Keyboard



The MFJ452 'Super CW Keyboard' has all of the features of the MFJ451 with the addition of a two line LCD display, you see what is being sent on one line while you see what you are typing on the other, and a total of eight 2500 character memories.

Nonvolatile memory stores all your messages and settings for up to 20 years! Commands can be stored in messages, for example you can have auto-incrementing serial numbers sent automatically!

MFJ452 Morse keyboard with display **\$289**



The SUPER MORSE-MASTER is possibly the most sophisticated memory keyer ever devised!

With the MFJ493 you get all of the features of the MFJ492 MORSE-MASTER but with a host of add-on features like these:

- 32,000 characters of memory
- Can use standard AT type keyboard for sending
- Built-in serial port for automatic control & loading memories from computer. Can edit & display and save messages remotely
- As you key CW, ASCII is sent to serial port for monitoring or recording transmissions
- Adds QSO simulator to MFJ492 training features
- Uses 12-15V DC supply, not included. Works with standard 101 key AT keyboard

MFJ493 Super MORSE MASTER keyer **\$309**

PC Memory keyer

Let this amazing hardware and software package for your IBM-PC or compatible turn your computer into a full fledged memory keyer!



With 10 banks of 10 memories you can have a total of 100 function key macros. You can send a message within a message, pause to key in information, send part of a message at a different speed. Send CW beacons, have automatic serial numbering for contesting and a of this with on-line help! You can use a straight key, a single lever or dual lever keyer or send code from the keyboard.

MFJ1268 PC Memory keyer **\$95.00**

MFJ451

Morse Code Keyboard

\$195

32K memory CW keyboard



In the MFJ498 you not only get all of the features of the world's most powerful Morse code keyboard but you have 32K of lithium battery backed-up memory and a complete code training system, all in one box!

Use all of the MFJ Morse keyboards you can plug in an iambic key and use the unit as a complete high performance keyer.

MFJ498 32K Morse keyboard & display **\$399**

Morse keys and keyers

Solid Brass Morse Key



The Kent Morse Key Kit is engineered to the highest specifications from solid brass. Uses solid silver contacts & sealed ball race bearings, ensuring totally free pivot movement with minimum friction on and eliminating side play. Precision contact and spring adjustment with fine pitch threaded screws with instrument knurled heads.

MM004 Morse Key kit **\$151.25**

Bencher Iambic Keyer



MM001 Black **\$151.25**
MM002 Chrome **\$187.55**

With adjustable contact spacing, precise tensioning adjustments and plated copper contacts, the BENCHER keyers are truly precision instruments designed to last you a lifetime. A choice of base finishes is available with the key mechanism made from chrome plated brass. Bencher keyers work as well as they look and give you a truly smooth as silk keyer, whatever your needs.

Vibroplex Original



The Vibroplex Original is little changed today from the original design of 1890. Considered by many to be the greatest "semi-automatic" keyer ever made.

MM011P Gold base **\$420**
MM011D Chrome **\$285**
MM011S Grey wrinkle **\$260**

Electronic Keyer II



The MFJ4018 Electronic Keyer. I uses the world famous Curtis 8044ABM integrated circuit. It lets you send iambic, automatic, semi-automatic or manual with your dual lever, single lever paddle or straight key. Front panel speed control covers 8 to 50 WPM and the volume control adjusts to give a comfortable listening level. Internal controls are provided for weight, dot-dash spacing and tone. Uses 9V battery (not included), measures 10.2 x 5.1 x 89mm.

MFJ4018B Keyer **\$106.90**

Kent Iambic Paddle



The two paddle (Iambic) Morse key can be used with the KENT Iambic keyer, MFJ Morse keyers, the MFJ31278 multi-mode controller and internal keyers such as those available for ICOM or Kenwood transceivers.

MM005 Morse Key kit **\$181.50**

Bencher single lever key



MM003 Black **\$151.25**
MM003A Chrome **\$187.55**

Kent Single Paddle Key



The KENT single paddle key is designed to allow each individual operator total flexibility in setting and adjustment, achieved by the unique springing arrangement which allows separate right and left spring tension adjustment with finger tip control.

MM003 Keyer kit **\$151.25**

Logikey CMOS keyer & Remote Controller



The Logikey keyer is driven by the key itself so you don't need a host of controls. Try it, it is amazingly effective! Can be used with any Iambic keyer unit, such as the Bencher, Vibroplex and MFJ units seen on these pages.

MM008 Keyer **\$248.40**

Kent Electronic Keyer



The KENT Electronic Morse Keyer Kit uses CMOS logic to generate Morse at speeds from 5 to 40 words per minute at the standard dot-dash ratio of 1:3. The kit is supplied with the circuit board pre-assembled and tested. Yes, only supply a bit of labour to complete the assembly.

MM007 Keyer kit **\$156**



The Logikey Keyer can be fitted with an optional remote control unit which can be mounted to the Bencher, Iambic Keyer. Take the controls of the keyer direct to the key, right where you want to use them. The remote control is shown here attached to an MM001 key. (Key not included in price).

MM008A Remote control **\$84**

Vibroplex Iambic



Based on the Vibroplex Original, the Iambic brings the Vibroplex tradition to the modern world of Iambic keying and fully automatic keyers. Will work with any Iambic keyer.

MM012P Gold base **\$350**
MM012D Chrome **\$260**
MM012S Grey wrinkle **\$240**

Vibroplex Vibrokeyer



The Vibroplex Vibrokeyer is designed for the "Bug" user who wants to move to electronic keyers. Its single lever paddle arrangement imitates the automatic dots and dashes of the electronic keyer with the same motion used to operate the "Bug".

MM013D Chrome **\$250**
MM013S Grey wrinkle **\$190**

Vibroplex Brass Racer



Available in two versions, one with an internal electronic keyer, the Brass Racer is the latest in the Vibroplex line. Using magnets for tensioning, this lightweight little key is just the thing for mobile, expedition or portable use, just the thing when space is at a premium.

MM014 with keyer **\$320**
MM015 key only **\$130**

Custom keyer for Bencher Iambic Paddles



Combine all of the features of the MFJ keyer with the Curtis 8044ABM IC and put it in a package that mounts directly onto the Bencher Iambic keyers and you have the MFJ4228! Power it with an internal 9V battery or from an

external DC power source. Also mounts on MFJ564 paddles.

MFJ4228X Keyer **\$160**
MFJ4228B Keyer & key **\$292**

MFJ Iambic Paddle



MFJ Deluxe Iambic paddles feature a full range of adjustments in tension and contact spacing, self-adjusting nylon and steel needle bearings, contact points which almost never need cleaning, precision machined frame and non-slip feet on a heavy chrome base. Can be used with the MFJ4228X keyer and the MFJ490X MorseMaster keyer.

Chrome plated base and metal parts.
MFJ564 Iambic paddle **\$110**

The Scout

The remarkable new Scout automatically finds frequencies and records them and will tune a receiver. Record a series of frequencies and then load them to a scanner for review.



- 10MHz-2.8GHz frequency range
- Six hour battery life
- Works 10-120 metres from transmitter
- Use as frequency counter tool
- Exclusive Optoelectronics digital filter and capture technology
- 50 memories for discrete frequencies
- 250 Hz counter for each memory
- React on tones some receivers
- Interfaces to PC for datalogging.

25 Frequency Scout \$820

HandiCounter 3000A

The world's most highly advanced hand-held counter. Covers to 3GHz with frequency and multi-function features. Period, Ratio and Time Interval, all in the palm of your hand.



- 10Hz-3GHz, 0.1Hz resolution
- Period, time interval, ratio, average
- 250MHz direct counting
- Dual 50Ω/1MΩ inputs
- Exclusive Optoelectronics digital filter and capture technology
- 10 digit LCD display
- 1s-10-1yr time base
- Optional TCXO available
- Interfaces to PC for datalogging.

3000A HandiCounter \$719

HandiCounter M1

The M1 counter has the same 10Hz-2.8GHz range as the 3000A but no universal counter functions. Digital filter and capture still available as well as digital communications port.



- 10Hz-3GHz, 0.1Hz resolution
- 250MHz direct counting
- 50Ω/1MΩ input
- Exclusive Optoelectronics digital filter and capture technology
- Sensitive inputs for ease of use
- 10 digit LCD display with electroluminescent backlighting
- Low power, 4 to 5 hours battery life
- Interfaces to PC for datalogging.

M1 HandiCounter \$512

Mini HandiCounter 3300

The smallest member to the family still offers 1MHz-2.8GHz performance, 10 digit LCD display and long battery life in a package almost too small to believe.



- 1MHz-2.8GHz, 0.1Hz resolution
- 250MHz direct counting
- 50Ω input
- Sensitive inputs for ease of use
- 10 digit LCD display
- Low power, 4 to 5 hours battery life
- Easily replaced battery pack
- Maximized sensitivity for picking up transmitters at greatest distance
- Very compact, true pocket size

3300 MiniCounter \$286

Decode tone information

The DC440 decodes CTCSS, DTMF & DCS signals output from receiver. Can be computer interfaced for logging purposes.



DC440 Tone decoder \$532

Collecting data with a frequency counter



Many Optoelectronics products, including the 25, 3000A, M1, SSB220A and 8040 can be connected to a PC for data collection and logging. When used in conjunction with the DC440 decoder tone frequencies can be recorded as well.

Please call for details of optional interfaces and software

Communications Interceptors

Optoelectronics presents a totally new instrumentation concept, the Model R10 FM Communications Interceptor. Developed for two-way communications testing, it has significant impact in security, counter-surveillance and recreational communications monitoring applications.

The Interceptor™ measures deviation (wide and narrow band), relative signal strength, signaling tones (CTCSS, DCS, and DTMF) using the companion DC440 Decoder. The R10 can be used for any measurement requiring demodulated FM. The R10 is ideal for testing VHF, UHF and Cellular transmitters and can be a low cost, highly portable substitute for a service monitor in some applications.

New Technology

The Interceptor™ responds to any strong signal present, unlike a conventional radio receiver or scanner. Conventional receivers are stabilised and tuned to a particular frequency by an internal oscillator. The Interceptor is stabilised by the signal it is receiving. The advantage of this process is that the Interceptor™ does not have to be tuned to a frequency in order to receive a signal. Any FM signal from 30MHz to over 2GHz can be intercepted without gaps in coverage. The Interceptor™ is completely automatic for hands free operation.

Security & Counter Surveillance Applications

This great sensitivity to Near Field signals makes the Interceptor™ ideal for RF security

and counter surveillance applications. The signal strength bargraph is useful in locating stock transmitters or listening devices concealed in a room or automobile.

Communications Monitoring

In the Near Field — Unlike the scanners and receivers that must be tuned to a specific frequency or scanned through a fixed frequency range, the Interceptor™ will provide an exciting new dimension to recreational monitoring with near instant response to strong signals. Communications monitoring hobbyists will be able to take the Interceptor™ on cruise ships, to military bases, theme and amusement parks, zoos, airports, to space shuttle launches, parades, sporting events, car races and anywhere else two way FM communication is used.

R10 Interceptor

\$729

The Optoelectronics R 20 AM near field interceptor is useful for detecting AM signals and measuring the strength of signals from 5-2500MHz. It can be used for amateur, CB or AM broadcast testing as well as for locating hidden transmitters (bugs) and checking microwave oven leakage.

R20 Interceptor

\$245

8040 Multi-Function bench/portable counter

A 10 digit electroluminescent backlit LCD display, 3GHz performance and all the features of a universal counter make the 8040 a winner for general purpose bench, laboratory or field use.



This counter is "big brother" to the 3000A and has additional signal conditioning and options for higher stability time bases. Both 50Ω and 1MΩ inputs are provided for both inputs and each has a separate trigger level control.

\$1700

8040 Multifunction bench/portable counter

SSB220A SSB counter

The truly unique SSB220A can measure the actual output frequency of an SSB transmitter. Also useful for general purpose applications to 3GHz.



By feeding a known audio signal to the transmitter you can easily determine which sideband and what frequency is being transmitted. The SSB220A uses the latest direct digital synthesis and digital signal processing technology.

SSB220A 3GHz SSB counter

\$825

THE NEW 1995 ARRL HANDBOOK

Every so often, a book comes along which becomes an instant classic. It's no exaggeration to describe the 1995 edition of the ARRL Handbook for Radio Amateurs in these lofty terms.

For this edition, the ARRL assembled the best and most knowledgeable writers on subjects ranging from analogue electronic theory to transceivers, repeaters to DSP, circuit construction to interference, transmission lines to antennas and propagation. If it's amateur radio, it's in the 1995 Handbook. It would be impossible to list all the features that make this respected book the one reference all amateurs around the world will find indispensable. A few highlights will provide an idea of the scope of the 1995 Handbook:

- In the Modes chapter, you'll find an overview of the many ways amateurs communicate, from the call/affixing of Morse Code to the complex but

powerful digital techniques which will guide amateur radio communication into the next century.

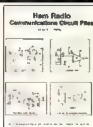
- Whether you're an experienced builder or a neophyte, you'll find the Circuit Construction chapter useful as it takes you from schematic to finished project.
- The AC/DC Sources chapter explains, clearly and concisely, modern solid state and synthesizer design.
- Mathematics for Amateur Radio provides a refresher course in the math concepts which form the bases of amateur radio and electronics.
- The Station Setup and Accessories chapter shows how to set up or enhance your station for top performance; among other projects, includes a boom/handset rack and three computer interfaces.
- In the Transceivers chapter, you'll learn about the systems and design which go into modern radio equipment. Projects include a beginner's shortwave receiver, QRP transceivers and a 50W solid state linear amplifier.
- The References chapter brings together, into one place, the tables and charts amateurs need and use most often.



Order Code BR369 © 1995 ARRL

\$66.00

REFERENCE, PRACTICAL CIRCUITS & DESIGN



RADIO COMMUNICATION HANDBOOK — RSGB

The RSGB's Radio Communication Handbook 5th Edition reprinted 1988. The society does not revise this handbook annually (or even frequently). Instead, the book changes when technology has changed sufficiently to justify it. This means that each new edition is virtually a new book, each chapter being completely revised and updated. And it's practical down-to-earth information which every amateur needs. One of the attractions of radio communication is the way in which fundamental ideas and techniques remain valid in the midst of innovation. This large handbook with 22 chapters will help in many ways.

Order Code BR266 5th ed. © 1988 RSGB

\$56.00

HAM RADIO COMMUNICATIONS CIRCUIT FILES

Volume 1 by Ed Knoll, W3FQJ, first printed 1980, reprinted 1991. Large 210 x 275mm 86 pages. Even the casual experimenter can become expert with Ed Knoll's Ham Radio Communications Files. This book covers bipolar and field-effect transistors and linear ICs. Each circuit has been built and carefully checked out by the author. The component values are given on each schematic diagram. An explanation on and often a suggested experimental procedure are included with each circuit.

Teach yourself solid state electronics by beginning with the first circuit and proceeding through the 61 circuit in this easy-to-follow book. The circuits are arranged for progressive study as in a course with experiments.

Teachers or experienced hobbyists will find they can go directly to the individual chapters for inspiration or ready-to-use circuits.

Order Code MFJ37 1st ed. © 1980 MFJ

\$24.95

AMATEUR RADIO TECHNIQUES

By Pat Hawker, G3VA. This is an ideas book and a source book, not a conventional text book. It assumes the reader has (and uses) his or her handbooks and therefore does not repeat basic theory and practice. Instead, it concentrates on new or little-understood techniques, use suggestions, but many others which can be simply incorporated into an amateur station. This ever-popular work brings together a variety of circuit ideas and devices, information on antennas, plus many constructional and fault-finding hints, gathered in over 22 years of writing the Technical Topics column in the RSGB's Radio Communication.

Chapter headings: • Semiconductor • Components and Construction • Receiver Topics • Cable Topics • Transmitter Topics • Audio and Modulation • Power Supplies • Aerial Topics • Fault-finding and Test Units.

Order Code BR393 7th ed. © 1991, RSGB

\$30.00

THE ARRL ELECTRONICS DATA BOOK

Doug DeMaw, W1FB, presents a handy reference for the RF design engineer, technician, radio amateur and experimenter. This one source has all of those regularly-used tables, charts and those hard-to-remember formulas. You'll find hundreds of popular circuit diagrams of oscillators, mixers, amplifiers and other devices, and their operating parameters including ferrite materials etc. This book may be used alone or to complement The ARRL Handbook and belongs in every technical library.

Order Code BR201 2nd ed. © 1988 ARRL

\$40.00

AMIDON FERRITE & POWDERED IRON

TECHNICAL DATA BOOK

This edition of the very popular Amidon Data Book was completely revised and updated in 1992. This volume contains reluctance charts, flux density curves and wire turns charts on iron powder and ferrite cores for RF, RF suppression, switch-mode power supplies and broadband transformer applications. It also covers surface-mounting beads, RF coil assemblies, "E" cores, rods and pot cores. Many new sizes and shapes have been added since the last printing. Dayton stocks all the items in this book.

Order Code BR44 © 1992 Amidon Associates

\$12.50

TECHNICAL TOPICS SCRAP BOOK

Technical Topics is one of the most popular columns in the RSGB's magazine Radio Communication, and has been for many years. Each month Pat Hawker presents an invaluable selection of circuit ideas and devices, information on antennas and related topics plus many constructional hints. This book contains the complete Technical Topics column from 1985 to 1989 inclusive, together with a new index.

Order code BR37 1st ed. © 1993 RSGB

\$35.00

SPREAD SPECTRUM SOURCEBOOK

If you're tired of hunting for bits and pieces of information on spread spectrum, the ARRL Spread Spectrum Sourcebook is for you. You'll find reprints of most spread spectrum articles from QST and QEX as well as articles and news items from the ARRL Newsletter. Also included in this 384-page softcover book is historical information on spread spectrum's beginnings and an introduction by Robert Dixon, a well-known author on this subject.

All the information you want — at your fingertips. The hunt is over.

Order code BR365 1st ed. © 1991 ARRL

\$52.00

SOLID STATE DESIGN FOR THE AMATEUR

First published by the ARRL in 1977 and reprinted by popular demand with corrections. This large book of 256 pages by Doug DeMaw and Wes Hayward has become the bible of many an avid home-brewer, and with good reason. Solid State Design for the Radio Amateur is among the select few technical books which have sold more than 50,000 copies. Why has it achieved this enviable milestone? For one thing, it's chock full of good, basic information — circuit designs and their applications and descriptions of receivers, transmitters, power supplies and test equipment. Much of the data such as that on transistor modelling cannot be found in any other publication.

Order code BR171 1st ed. © 1977 ARRL

\$32.00

HINTS AND KINKS FOR THE RADIO AMATEUR

This book from the ARRL is a collection of practical ideas from the ever-popular Hints and Kinks column of QST. Amateur radio know-how from amateurs who know how. Every article a new — this edition is not just an update. Join the contributors to QST's most popular technical column as they share hands-on experience in virtually every aspect of amateur radio. Whether you traffic the delights by way of mail, key, keyboard or camera, whether you prefer the test bench to the traffic net or modeling to moonbouncing, whether your enjoyment of amateur radio spans days or decades. Hints and Kinks has ideas, tricks, updates, projects, antenna systems and many practical tips. Offers many modifications to popular rigs including Icom, Kenwood, Yaesu, AEA, Amstron, Drake, Heath, MFJ, Ten Tec and Collins. 172 pages 210 x 275mm.

Order code BR330 13th ed. © 1992 ARRL

\$26.00

W1FB'S DESIGN NOTEBOOK

Do you like to build amateur radio equipment? Would you like to? If your answer to either of these questions is yes, then this book by Doug DeMaw, W1FB is for you. This famous Doug strikes again! Another supremely practical book published by the ARRL, this plain-language book is filled with simple, practical projects which can be built using common hand tools. You'll not need exotic or hard-to-find components to build the projects, nor will you need elaborate test equipment to make them work. This book is a bit of a sort of useful information on designing and building your own equipment. Has complete receiver and transmitter designs as well as all sorts of useful info and partial designs for the home-brewer.

Order code BR357 1st ed. © 1990 ARRL

\$26.00

TRANSMISSION LINE TRANSFORMERS

This second edition includes some 100 extra transformers, many interesting and unexpected designs, using both the Ruthroff and Guan's approaches. Though the primary goal of the book is to supply a great variety of transformers for matching 50Ω cables to antennas in the 1 to 30 MHz range, many of them should perform well in other areas. Dayton Communications stocks most of the ferrite materials used in this book. 150 x 230mm hard bound.

Order code BR329 2nd ed. © 1991 ARRL

\$52.00

REFERENCE, PRACTICAL CIRCUITS & DESIGN (cont.)



MOTOROLA RF DEVICE DATA 1994

This 6th edition has been revised in 1994 in one volume. It presents technical information for the several product families that comprise the Motorola portfolio of RF products. They include bipolar, LDMOS, MOSFET RF power and Gallium Arsenide chip technologies in a variety of packages, a so discrete components, hybrid modules, and integrated circuits. This new edition presents a considerable number of changes.

Order code BR47 © 1994, 6th ed. Rev. 4 **\$42.00**

MOTOROLA RF AND VIDEO APPLICATIONS

This application book from Motorola has a total of 37 application notes on a wide range of RF and video applications. Some of the applications include: • Get 600 watts RF from four power FETs • Low-cost device gives broad band performance at 3 watts out • 300 watt amplifier using TP1940 MOSFET push-pull transistors • Phase-Locked Loop design fundamentals • Impedance matching networks applied to RF power transistors • A simplified approach to VHF power amplifier design • Tuning diode design techniques

Order Code BR428 DLE413/8 **\$65.00**

MOTOROLA COMMUNICATIONS APPLICATIONS

This application book from Motorola contains a total of 44 application notes on a wide range of communications subjects. Some of the applications include: • MC1576 balanced modulator • one driver and receiver applications • Equalization of OTMF signals using the MC34014 • VHF narrow band FM receiver designs using the MC3342 and MC3343 dual conversion receivers • infrared sensing and data transmission fundamentals • MC48HC0584 radio synthesizer • Low power FM transmitter system MC2831A • Basic concepts of fibre optic communications • Sensi to parallel converter using the MC6870P.

Order Code BR376 DLE411/3 **\$58.60**

VHF AND MICROWAVE



THE ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL

This book is written for the growing number of radio amateurs who are discovering that there is life on our frequencies above 420MHz! Chapter topics of this 448-page book include: • A brief history • Safety • Propagation • Microwave devices • Transmission media • Design techniques • System design • Microwave fabrication techniques • Antennas and feedlines • Earth-Moon-Earth (EME) communications • Getting started in microwave measurements, and • Tackling microwaves with microcomputers. 448 pages, 200 x 280mm. There are 26 programmes for PC-compatible computers on diskette (available separately) to aid in performing various tasks described in the book.

Order code BR325 1st ed. ©1991 ARRL **\$52.00**

Order code BR327 2 25" or 3 5" (State which when ordering) **\$22.00**

RSGB MICROWAVE HANDBOOKS

Microwave Handbook Volume 1, ©1989, covers operating techniques, systems analysis and propagation, microwave antennas, transmission lines and components, microwave semiconductor and tubes. Microwave Handbook Volume 2, © 1991, continues where Volume 1 leaves off, with construction techniques, common equipment, microwave beacons and repeaters, test equipment, safety filters and additional circuit data. Microwave Handbook Volume 3, © 1992, contains a review of microwave theory and practice, reference information, practical designs, hints and tips. Covers 1.3-24GHz

Vol. 1 - BR318 Components & Operating Techniques **\$38.00**

Vol. 2 - BR437 Construction & Testing **\$57.00**

Vol. 3 - BR447 Bands & Equipment **\$57.00**

ALL ABOUT VHF AMATEUR RADIO

By William L. Orr, W6SAI, this VHF handbook is for every amateur on six metres and up. Contains: • VHF propagation • The VHF bands, an overview • The VHF repeater and how it works for you • VHF moonbounce communications • Amateur satellite communications • VHF vertical and mobile and beam antennas you can build • VHF interference and how you can suppress it

Order Code BR216 2nd ed. ©1988 **\$25.40**

INTERFERENCE HANDBOOK

By William R. Nelson, WA6FQG, and edited by Bill Orr, W6SAI. WA6FQG is a former RFI investigator for Southern California Edison Company. This 250-page book is written from an RFI sleuth's perspective and is a diary of his experiences in solving interference problems. His experiences run the gamut from the common (arcing thermostats) to the bizarre (loose metal sheathing in a temporary building next to a 250kV transmission line). Besides a sort of power line interference causes and solutions, this book covers electrostatic discharges (jam or snow static, grounds and grounding, vehicle noise suppression, RF from non-linear devices: how the power company locates RFI, how to RF-proof your transmitter, how some receivers suffer from self-induced RFI, and solutions to RFI in various electronic devices

Order Code BR181 2nd ed. 1988 **\$25.60**

RADIO FREQUENCY INTERFERENCE

How to Find it and Fix it

What is it? • Black bars that flash across a TV picture in a curious, rhythmic pattern • A garage door opener which opens or closes the door by itself • A raucous buzz which drops out AM stations • Car engine stumbles or hesitation near radio towers • A touch-controlled lamp with a mind of its own. These strange behaviours (and countless others) may be effects of electromagnetic interference.

If you experience these or similar problems, this book can help. Here, the ARRL, has combined the work of numerous interference experts for your convenience. Chapters explain how to: • Locate help • Resolve conflicts • Locate interfering equipment • Discuss RF/EMC problems and cures for specific electronic systems. Transmitters, Stereos and other audio devices, Televisions, Power units, Computers, Telephones, and Cars.

This book is published by the ARRL, paperback, 210 x 275mm

Order Code BR186 1st ed. ©1991 ARRL **\$40.00**



THE VHF/UHF MANUAL

By G. R. Jessop, G4JF. This tome has long been the standard text book on the theory and practice of amateur radio between 30MHz and 24GHz. No serious VHF'er should be without this book. You'll find information on the history of VHF/UHF communications, propagation, tuned circuits, receivers, transmitters, solid state and valve equipment, filters, antennas, microwaves, space communications and test equipment

Order Code BR267 4th Edition © 1983 RSGB **\$40.00**

THE VHF/UHF DX BOOK

The VHF/UHF DX Book from DLR Publishing of the UK helps you with one of amateur radio's greatest challenges: contacting stations in far away places. Here's some of what you'll find: • how to assemble your VHF/UHF station • VHF/UHF propagation information • operating techniques • designs for UHF and VHF transmitters • antennas • transmitters • power amplifiers • EMC • power supplies • station control • test equipment. Much more

Order Code BR27 1st ed. ©1992 DLR Publishing **\$52.00**

THE UHF COMPENDIUM - by Germany

Parts 1, 2, 3 & 4 of this work are available in English. Parts 1 & 2 are contained in Volume 1. Parts 3 & 4 are found in Volume 2. Part 5, printed only in German, is in Volume 3. All Volumes are 8.5" x 11"

Vol. 1 (parts 1 & 2) BR250 **\$75.00**

Vol. 2 (parts 3 & 4) BR251 **\$75.00**

Vol. 3 (part 5, in German only) BR354 **\$62.50**

YOUR VHF COMPANION - ARRL

Your VHF Companion lets you explore the fascinating activities on the VHF bands. FM and repeaters, packet, CW and SSB, satellites, amateur television, transmitter hunting and more. A handy reference section helps you locate equipment, books, magazines and software. A must for all new hams and all 'veterans' as well!

Order Code BR461 1st ed. ©1992 ARRL **\$21.00**

VHF/UHF/MICROWAVE & PACKET CONFERENCE PROCEEDINGS

The following volumes represent much of the most interesting material presented at the five of the largest VHF/UHF conferences in the English-speaking world. These collections are essential reading for anyone interested in operation at or above 70cm.

AMSAT-NA PROCEEDINGS

1987	ORDER CODE BR189	\$10.00
1988	ORDER CODE BR378	\$17.00

MICROWAVE UPDATES

Microwave Update 1993	ORDER CODE BR467	\$32.00
Microwave Update 1994	ORDER CODE BR461	\$32.00
Microwave Update 1988	ORDER CODE BR183	\$17.00
Microwave Update 1987	ORDER CODE BR174	\$17.00

VHF SOCIETY PROCEEDINGS

27th Central States VHF Society Oklahoma City Oklahoma		
1993	ORDER CODE BR470	\$32.00
26th Central States VHF Society Oklahoma City Oklahoma		
1994	ORDER CODE BR50	\$32.00

PACKET RADIO PROCEEDINGS

Each of these volumes contains a wide range of papers on all forms of digital modes and presents the history of packet radio from day one.

Number 11 1992	ORDER CODE BR174	\$32.00
----------------	------------------	---------

PRACTICAL FILTER DESIGN

Although filters are basically easy to understand, you don't get this impression from most books! This is a non-mathematical treatment for electronics hobbyists and technicians.

This Australian-published book, written by Jack Middlehurst looks at the circumstances where filters are needed, indicates which ones to choose for specific applications, and discusses their limitations. Details are given of the circuits, construction and tuning of LC filters, as well as simple active filters, state variable filters and switched capacitance filters. Butterworth, Chebyshev and elliptic forms of low-pass, high-pass and band reject filters are described, as well as active and passive crossover and notch filters.

To truly remove any difficulties with mathematics, computer programs in GW BASIC are provided on disk so that filters and their properties can easily be predicted.

ORDER CODE BR472 \$35.95 Includes free 3 5" DISK

RCA RECEIVING TUBE MANUAL

We have obtained a shipment of RCA Tube manuals from the USA. Published in 1959 (just a copy) this manual has a most complete data section covering valves from the 30s to the end of the valve era. There is also approx. 68 pages of valve application data plus information on valve testing and a section of circuits — all 385 pages of information.

This manual has been prepared to assist those who work or experiment with electron tubes and circuits. It will be valuable to engineers, service technicians, experimenters, students, radio amateurs and all others technically interested in electron tubes.

Order code BR34 \$22.00

PACKET RADIO ... RTTY ... AMTOR BOOKS



PROH: Packet Radio Operators Handbook

Buck Rogers, K4ABT packet radio editor of CQ Magazine — the godfather of packet radio — spent two years compiling information to write the most comprehensive handbook ever for the packet radio user. With PROH you can become a PRO by having this handbook as ready reference for the most useful applications in packet radio today. In this book you will learn everything you need to know to build a packet station; it covers all modes in use today including ROSE and 9600 baud operation.

Order code MFJ3036 \$26.00

YOUR GATEWAY TO PACKET RADIO

As the answers and much more are in this book by Stan Horzepa, W4LOU, published by the ARRL.

In the five years since the ARRL first published Your Gateway to Packet Radio interest in packet has exploded! To keep up with the expanding interest and evolving technology, this second edition contains 73 more pages — and nearly 50 per cent of the original material has been revised. Newcomers will still find the basics on installation and operating procedures.

Order code BR169 2nd Edition © 1989 ARRL \$32.00

THE PACKET RADIO OPERATORS MANUAL

This new packet radio manual from CQ Communications written by Buck Rogers, K4ABT is a big 220 x 226mm and contains 162 pages. Covers packet radio, packet v. deo, networks, modes, gateways, antennas RF1 causes, defining RS232 and a lot more.

Order code BR43 © 1991 CQ Communications \$37.50

AX.25 Amateur Packet-Radio Link-Layer Protocol

This protocol is intended as a guide to aid in the design and use of amateur packet radio systems. In order to ensure link layer compatibility between stations. The link layer is one of the international Organisation for Standardisation (ISO) seven layered reference model of Open Systems Interconnection (OSI).

Order code BR178 Version 2 to 1984 ARRL \$20.00

PACKET RADIO PRIMER

From the RSGB, this book is written by Dave Coomber, G8UWZ and Maarten Cret, G8NLU. This introduction to the exciting new world of packet radio will help any beginner to get started with the minimum of fuss. Detailed practice advice on connecting equipment is covered by a guide through the maze of configurations possible.

Order Code BR440 ©1991 RSGB \$28.00

NOSIntro

An introduction to the KAVO Networking System, an Wade, G3NRW. In NOSIntro you'll find a wealth of practical information, hints and tips for setting up and using the KAVO Networking Operating System (NOS) in a packet radio environment. The emphasis is on hands-on practicalities. You'll see how to install NOS on a PC, how to set up the communications, and lots more.

Order Code BR468 \$45.00

Your RTTY/AMTOR COMPANION

Explore HF digital communications with your multi-mode controller. This book by Steve Ford, WB8IMY, is your introduction to the exciting world of HF digital communications. Learn how to assemble your own RTTY/AMTOR station and communicate effectively on the air. You'll also learn the basics of new HF digital modes such as CLOVER and PacTOR.

Order Code BR45 1st ed. ©1991 ARRL \$21.00

RTTY TODAY

This is the only modern book on RTTY that we know of for the radio amateur. Home computer systems used with multi-mode controllers and dedicated electronic terminals have opened the way for everyone to enjoy the action regardless of their technical background.

Order Code BR003 Universal Editions ©1993 \$20.50

THE RTTY LISTENER

The RTTY LISTENER is a special magazine to inform and educate amateurs and SWLs on tuning various types of Digal Tag Signals. This book contains issues #1 through 25.

Order Code BR23 ©1991 2nd ed. Universal Radio \$40.00

The RTTY Listener issues #26 to 30.

Order Code BR24 ©1992 1st ed. Universal Radio \$12.50

The RTTY Listener issues #31 to 33.

Order Code BR42 ©1994 1st ed. Universal Radio \$9.50



HELP FOR NEW HAMPS & MORSE

AUSTRALIAN RADIO THEORY HANDBOOK

The 1991 edition by Fred Swainston was written to cover the Australian S.M.A. syllabus for the Novice and Amateur Operator Certificates of Proficiency. It contains the theory necessary to pass the Australian Certificates of Proficiency and is concise and easy to understand. The books sets out to teach those who have no knowledge of radio theory or electronics. The subjects in the book are presented in a logical sequence with test questions at the end of each chapter, covering key points in the text. A separate chapter on the mathematics required for amateur examinations has also been included, because this is often presents a problem to those studying radio theory. Sample examination papers are included. 344 pages 1991 11" x 8".



Order code BR265 2nd ed. 1991 \$47.95

FIRST STEPS IN RADIO

This book is a reprint of the wide-ranging *First Steps in Radio* series by Doug DeMaw. W1FB published in 1984 and 1985 in QST. The entire QST series is reproduced here. You will find this book a great help for newcomers to learn the electronic theory needed for licensing exams and to gain some insight into how radio equipment works.

In *First Steps in Radio* you will find basic explanations of circuit components, see these components assembled into practical circuits, and see how the circuits make up your radio gear. Additional segments cover antennas, propagation and radio frequency interference at a beginner's level.

Although you may never "hoi" your own equipment, you will gain an understanding of what goes on behind the front panel and take pride in that knowledge.

Order Code BR385 1st ed. 1985 ARRL

MORSE CODE THE ESSENTIAL LANGUAGE

\$16.00

Written by L. Peter Carron. W3DKV this book tells the evolution from the straight key to computers. It gives practical advice on learning the code and its modern-day uses. There are seven chapters: Why the code? A history of telegraphy. The code. Learning to receive and send. High-speed operation. Distress calls. The future.

The history of Morse Code is steeped in tradition, not only in amateur radio but in other services as well. Although some of the thoughts conjured up are of times gone by, the code is as useful today as it was on the day of its invention. The 1991 edition of this small book will help you find out much, and help you to learn or relearn the code.

Order code BR223 ©1990 ARRL

\$16.00



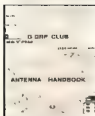
VIBROPLEX COLLECTORS GUIDE

This new book, written by Tom French, W1IMO, is a must for anyone interested in Morse keys. There are reproductions of every Patent for the Martin keys. The *AUTOPLEX* in 1903, then the first *VIBROPLEX* key in 1904. All the patents are reprinted in full, complete with the original patent drawings.

Many details and old advertisements are reproduced to aid in identifying the manufacturing date of your bug. Also chapters on adjusting your bug and the "collectible" keys. 215 x 280mm.

Order Code BR25

\$45.00



QRP CLASSICS

QRP Classics is a collection of projects for low-power enthusiasts taken from ARRL publications over the past 15 years. The equipment is generally simple and easy to build. You'll find projects for receivers, transmitters, transceivers and accessories. 11" x 8 1/2" 274 pages.

Order code BR323 1st ed. ©1990 ARRL

\$32.00

G-QRP CIRCUIT HANDBOOK

Compiled by the Rev George Dobbs, G3RJV, from the G-QRP Club journal, *SPRAT* from 1974-1982. This book contains 94 projects and practical circuit ideas, spread over three chapters: Transmitters, Transmitters and Receivers, and Station Equipment. Circuit ideas.

Order code BR441 ©1983 G-QRP Club

\$31.00

Your QRP OPERATING COMPANION

Your QRP Operating Companion shows that you don't need special rigs and equipment to enjoy the joys of low-power operating, ragchewing, DXing, contesting... are all more enjoyable with QRP. Includes operating tips, lists of QRP clubs, net and calling frequencies and a lot more.

Order Code BR110 1st ed. ©1992 ARRL

\$16.00



HELP FOR NEW HAMPS

Most of us have come across newly licensed amateur radio operators whose first and only thought is to get on the air and make contacts. On the other hand, many of us have known amateurs who fail to renew their licenses. They may have been full of enthusiasm at first, but for one reason or another it soon wore off. The ARRL wrote to a sample of these people, asking them why. Many said they had never made a contact! They had questions about every aspect of amateur radio. They wanted someone to answer their questions and to help them choose, install and operate their first station. Doug DeMaw, W1FB wrote this new book to help these new amateurs get started in amateur radio.

Order code BR308 1st ed. ©1989 ARRL

\$26.00

PRACTICAL ANTENNAS FOR NOVICES

Some strive for complete understanding of the theory of propagation and antennas. Others learn as much as they can and eventually reach a state where they believe they understand. This is all important stuff, and is often achieved by practical experimentation in the book. John Heys uses the immense wealth of his experience to guide the beginner using the "rules of thumb" (working by doing). Follow some or all of the designs, make changes and observe the effects, make notes of the changes and results, and quite rapidly a greater understanding will be achieved and, who knows, some as yet undiscovered design may be produced.

Order code BR35 1st ed. ©1992 RGB

\$18.50

GGTE MORSE TUTOR FOR IBM (DOS) COMPUTERS

Learn the International Morse Code or improve your capabilities. One 5.25" diskette will take you from beginner to over 100 words per minute. This useful package includes: Code speeds from 1 to over 100 words per minute. Standard or Farnsworth character spacings. Code conforms to international standards. Adjustable tone frequency. Over one billion QSOs possible. Covers letters, numbers and punctuation marks. Random characters specification for each lesson. Random characters review for all previous lessons. Random words for each lesson. Display text while listening or after copying. All parameters are remembered from one lesson to the next, and may be changed as desired.

5.25" IBM-PC Disk BR187

\$20.00

3.5" IBM-PC Disk BR187A

\$20.00

MORSE CODE PRACTICE TAPES — from the ARRL

Code Tapes — ARRL Set #1: 5-10 WPM

BR331 \$22.00

Code Tapes — ARRL Set #2: 10-15 WPM

BR332 \$22.00

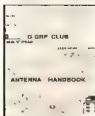
Code Tapes — ARRL Set #3: 15-22 WPM

BR333 \$22.00

Code Tapes — ARRL Set #4: 13-14 WPM

BR334 \$22.00

QRP BOOKS



G-QRP ANTENNA HANDBOOK

The second book from the G-QRP Club of the UK, compiled and edited by P. Linsley, G3PDL and T. Nicholson, K4WVU/GWOLNQ. A compilation of antennas, matching units and associated articles from *SPRAT*, the journal of the G-QRP Club. First edition 1992. A large book, 210 x 300mm, of 155 pages. The book is divided into seven sections: Antenna Matching Units and Test Equipment; HF Beam Antennas; HF Wire Antennas; HF Vertical Antennas; HF Loop and Restricted Antennas; Antennas for the VHF Bands; Appendices.

Order Code BR452 1st ed. ©1992 G-QRP Club QRP NOTEBOOK

\$22.50

You can work the world with few watts or less in this book Doug DeMaw, W1FB presents construction projects for the QRP operator from a simple one-watt crystal controlled transmitter to more complex transceiver designs. Rather than simply presenting a collection of completed units, Doug guides you through the projects building block style. This way you gain an understanding of how the circuits operate and learn how the building blocks might be put together in other configurations. 11" x 8 1/2" 80 pages.

Order Code BR170 2nd ed. ©1991 ARRL

\$26.00

ANTENNA BOOKS

THE ARRL ANTENNA BOOK 17th ed 1994



The 17th Edition (1994) of The ARRL Antenna Book: Editor R. Dean Shaw. NABV. With 28 chapters • Over 700 pages • Over 900 figures • A 14 page index. This book covers everything from dipoles to multi-element stacked arrays. Several chapters have been completely rewritten, benefiting greatly from the latest computer modeling programs. The HF chapter is completely new, with more than 70 optimized designs for the HF bands. The propagation chapter contains extensive tables on the elevation angles necessary for communication throughout the world. FREE with this book is a 3.5" disk of antenna-related software for the PC. Included is a state-of-the-art Yagi Analysis program. The 17th edition is certainly big (210 x 270mm and 35mm thick, 736 pages).

Order code BR370A ARRL ©1994 **\$65.00**

With **FREE Computer Software**

Antennas and Techniques for Low-Band DXing

By John Devoldere, ON4UN

Crammed with antennas and techniques, LOW BAND DXing can be your ticket to low-band success. Draws on the experiences of successful DXers and the author's own considerable experience. John Devoldere shares with you the tips and techniques that can make the difference between a station that takes part in a contest and the one which wins. You don't need to be a mathematician in order to duplicate the standard antenna designs. The 373 pages are packed with antenna designs—covers feedlines too—with equipment reviews, low band propagation, operating techniques and much, much more.

BR195 ARRL 2nd Ed. ©1994

\$52.00



W1FB's ANTENNA NOTEBOOK

By Doug DeMaw, W1FB

You will find no high-level maths in this publication. You will find some simple equations where they are necessary to explain a concept or to calculate the length of an antenna element and its matching section. Explicit drawings with no numerical labels are used in a effort to clarify the illustrations to the fullest measure.

For the most part this book presents simple wire and tubing antennas that can provide satisfactory performance for a host of operating objectives. This text also dispenses some of the common misconceptions about antennas which get passed over the air and at hamfests. Free advice is not always accurate despite the good intentions of the giver who offers his assist. ant! 128 pages 200 x 280mm.

Order code BR179 ARRL ©1991 **\$26.00**



THE QUAD ANTENNA

A comprehensive guide to the design and construction of high-performance quad antennas. Bob Haviland, WAMB. This large 220 x 280mm book is the only book we know of for the Quad antenna. It has chapters on • Delta Loops and Arrays • Mechanical Design • Optimizing a Quad design • Ground systems • Multi-band Quad feed systems • Multi-element Quads, put many more. Have and first began his Quad work 20 years ago when he moved to a location which wouldn't support a full-size Yag, and decided a Quad would provide a smaller size alternative.

Order Code BR41 ©CQ 1993 1st ed. **\$37.50**



REFLECTIONS: TRANSMISSION LINES AND ANTENNAS

By M. Walter Maxwell, W2DU. Tries to explode all the myths about VSWR, and this is the book to do it. In depth but extremely readable and understandable book discusses every aspect of SWR, antenna matching, transmission lines and balun design. The author was a noted antenna designer at RCA for many years.

Order code BR348 ARRL **\$52**

Order Code BR348A 5.25" IBM Disk **\$22**



ELECTRONIC SOFTWARE COMPENDIUM

From Buckmaster Pub. shing comes this CD-ROM collection of thousands of BM PC and MAC programmes for electronics and amateur radio. This carefully selected compendium should give every hobbyist something they need, lots of packet and antenna programmes.

Order code BR497 ARRL

\$45



ANTENNA IMPEDANCE MATCHING

Proper impedance matching of an antenna to a transmission line is of concern to antenna engineers and to every radio amateur. A properly-matched antenna as the termination for a line minimizes feed-line losses.

Complex matching networks can be developed using the Smith Chart, but the antenna impedance is needed. In a typical situation, both the antenna impedance and the transmission line impedance are known, the designer simply moves the antenna impedance points on the Smith Chart to find the most effective matching network. There is no mystique involved in designing even the most complex multi-element networks. Instead, a logical step-by-step procedure is followed, as discussed within the pages of this book. With an understanding of this information, antenna engineers and dedicated amateurs alike will find it a relatively simple task to design networks that will yield optimum performance.

Order code BR257 ARRL ©1989 **\$52.00**



TRANSMISSION LINE TRANSFORMERS

Includes some 100 new transformers for the second edition, many interesting and unexpected designs, using both Ruthroff's and Guanella's approaches.

Though the primary goal of the book is to supply a great variety of transformers for matching 50Ω cable to antennas in the 1.5 to 30 MHz range, many of them should perform well in other areas. Topics covered in the 15 chapters in this edition • Analysis, the basic building block • The Guanella Analysis • The Ruthroff Analysis • High frequency characteristics • Transformer parameters for low and high-impedance applications • Three chapters on unbalanced-to-balanced transformer designs • Baluns • Multi-match transformers • Material and power ratings • Simple test equipment • Hints & kinks • Selecting ferrites • Winding transformers • Constructing low-impedance coaxial cable • Dayton stocks many of the ferrite materials used in this book. 150 x 230mm, hard bound.

Order code BR329 ARRL ©1991 **\$52.00**



THE VERTICAL ANTENNA HANDBOOK

This book contains 20 chapters on the design and building of vertical antennas • Optimum antenna designs for DX • Basic principles of vertical antennas • Base impedance and methods of feeding and matching • Short vertical antenna considerations • Direct on-air vertical antenna design • Theoretical aspects of vertical stacking • Broad-band vertical antenna designs and configurations • Designing a specific directional vertical antenna including feed system • Using an equilateral triangle configuration for a simple directional array • The operation and design of the folded unipole antenna • The effects of earth on the efficiency of radiation and vertical pattern. Several practical designs are included.

Order code BR284 CQ ©1984 **\$22.00**



THE ANTENNA COMPENDIUM now 3 volumes



Three volumes are now available in the ARRL Antenna Compendium series, and each is packed with previously unpublished articles on all the popular types of HF/VHF/UHF antennas and some you've never heard of! In Volume 1 you'll find articles on a multiband portable, quads and loops, baluns and the Smith Chart. Volume 2 features several verticals, attic, in-band antenna modelling and propagation. Among the 42 articles in Volume 3, you'll discover a 12-meter quad, a discone, modelling with MININEC and NVA-JHF ray tracing.

All 3 Volumes are a feast for the antenna enthusiast! Companion software is available separately for Volume 2 and 3.

Volume 1 ARRL 1st ed. ©1985

BR163 **\$26.00**

Volume 2 ARRL 1st ed. ©1989

BR292 **\$32.00**

Volume 3 ARRL 1st ed. ©1992

BR455 **\$37.00**

Software (5.25") Vol. 2

BR293 **\$22.00**

Software (5.25") Vol. 3

BR455B **\$22.00**

Software (3.5") Vol. 3

BR455A **\$22.00**



HF ANTENNAS FOR ALL LOCATIONS

HF Antennas for All Locations by Les Mason, G8XN (RSGB) is renowned worldwide as probably the most in-depth look at practical amateur radio HF antennas available. This second edition has been completely revised and greatly expanded. There are more new antenna designs, including beams which cover more bands with fewer problems, no trap losses and better rejection of interference and a new chapter presents a comprehensive review of the ways to make antennas smaller, with particular emphasis on small transmitting loops. 7" x 9.5" 322 pages

Order Code BR188 ©1993 RSGB **\$45.00**



YAGI ANTENNA DESIGN

Yagi Antenna Design is based on the series in Ham Radio magazine by the late Dr James L Lawson, W2PV. Jim designed and built a highly-competitive and successful amateur radio contest station. The 210 pages in this hard-bound book cover the following subjects: • Performance calculations • Simple Yagis • Following optimisation • Loop antennas • Ground effects • Stacking practical designs • Designs for 7 through 28 MHz Copyright 1986 210 pages

Order code BR164 ©1991 ARRL **\$40.00**

PHYSICAL DESIGN OF YAGI ANTENNAS

This hard-bound book published by the ARRL in 1992, was written by Dr David B Lawson, W6QMS. It provides the tools for you to design and build robust Yagi antennas, using sound mechanical design principles. Lawson shares in detail his procedures for determining mechanical stress from wind and ice on elements, booms and masts. He includes abundant information on hardware and assembly techniques for surviveable Yagi antenna systems. The electrical significance of the resulting physical design is also treated thoroughly.

You need no longer fear the consequences of wind and ice storms on your antenna. With this information you can build or 'bribe' your existing Yagis so, like Lawson's, they will function in winds of 160 km/h and beyond.

Order Code BR388 ©1992 ARRL **\$52.00**
5 1/4" IBM Disk BR388A **\$26.00**

ANTENNAS by John D Kraus WB8JK

This second edition of ANTENNAS is a bible on antennas. Physical concepts are emphasised which aid in the visualisation and understanding of the radiation phenomenon. This new edition stresses practical approaches to real-world situations and much information of value is made available in the form of many simple drawings, graphs and equations.

Following a brief history of antennas in the first chapter, the next three chapters deal with basic concepts and the theory of point sources. These are followed by chapters on Linear, Loop, Helical, Biconical & Cylindrical antennas, and then on antenna arrays, reflectors, horn, horn, complementary and lens antennas. The last four chapters discuss broadband and frequency independent antennas, for special applications including electrically small and physically small antennas, remote sensing, radar scattering and measurements. The appendix has many useful tables and references. Hard bound, 892 pages

Order Code BR259 **\$104.00**
PRACTICAL ANTENNA HANDBOOK



By Joseph J Carr, it covers all frequencies from 160 metres to UHF and microwaves. It starts off with chapters on propagation and transmission lines. The transmission line chapter contains many non-sensational equations, and that's really all we need to understand and construct transmission lines. Smith charts are also covered. Without an understanding of these, stubs and matching sections become very difficult.

There is a chapter on antennas for town-house and apartment dwellers. Many practical construction techniques are described and there is a very good section on grounding. The computer programs for antenna design section is very informative and there is plenty of information for hickers.

Order Code BR26 1st ed. ©1989 TAB **\$44.00**

MicroSmith V2.0 SOFTWARE

ARRL MicroSmith V2.0, by Wes Hayward, W7ZOQ, is a Smith Chart simulation program for the IBM PC and compatibles. You don't need detailed knowledge of Smith Charts. Use MicroSmith to design matching networks with fixed or variable L/C components, stub-matching sections with transmission lines and more. It's done graphically on your computer screen. It's also useful for a variety of network analysis problems. Includes a 48-page user's guide with numerous illustrations.

Order Code BR499 3.5" Diskette **\$95.00**



THE EASY WIRE ANTENNA HANDBOOK



The inexpensive path to successful DXing. What's the least expensive and most effective way to equip your new transceiver, ORP rig or classic transmitter and receiver setup for worldwide amateur radio communications? Use a home-made wire antenna, naturally! This 1992 220 x 228mm, 112-page book by Dave Ingram, K4TW, is dedicated to fulfilling just that exact purpose. It's chock-full of ready-to-use designs and dimensions on both 'basic' and 'garn' antennas. There is information on hidden and disguised antennas, tuners and baluns, SWR meters, noise bridges, converting any antenna dimensions to your favorite HF band, and more... much more.

This book's contents are user-oriented rather than technical. It features large diagrams and easy-to-read text, and we're confident it will spend more time on your station's desk than collecting dust on your library shelf!

Order Code BR002 **\$25.00**

HF ANTENNA COLLECTION

A collection of the best articles from Radio Communication from 1986 to 1989, and other information useful to the HF antenna builder. Selected and edited by Erwin Davis, G4CQI first published in 1991, 180 x 245mm with 233 pages.

An invaluable collection of outstanding articles and short pieces which were published in the RSGB monthly magazine Radio Communication. As well as ingenious designs for single element, beam and miniature antennas, there is a wealth of information on ancillary topics such as feeders, tuners, baluns, testing, modelling and the mechanics of mounting an antenna safely. This book could just supply that vital idea for your next antenna project.

Contains nine chapters and six appendices

Order code BR391 RSGB ©1991 **\$44.00**



PRACTICAL WIRE ANTENNAS

Effective HF antennas for the radio amateur. Practical Wire Antennas from the RSGB by John D. Hays, G3BDQ, published in 1989. This book has been written for the non-mathematician whose knowledge of this subject has never extended beyond the high school syllabus. It is aimed at anyone who is capable of passing the radio amateur's examination, and the antennas described and illustrated are easy to set up and use successfully. There is additional data which will allow experiments and tests with versions that are cut for other bands or designed to fit into difficult locations. The simplified and easily-understood antenna theory is an attempt to allow the newest recruit to amateur radio to learn something about how simple wire antennas work at HF.

100 Pages 7" x 10"
Order code BR296 ©1989 RSGB **\$32.00**

EASY-UP ANTENNAS—for Radio Listeners and Amateurs

Would you like to learn how to construct low-cost easy-to-erect antennas? Written in 1988 by Edward M. Kozlowski, W3FQZ, a leading expert in the radio and electronics field, this compact handybook contains all the latest antenna design and construction tips and tools you need to build effective, inexpensive antennas that work and last.

This handy reference • Covers basic, do-it-yourself antennas for shortwave broadcast, AM broadcast, MW, LW, utilities for present and prospective amateurs and scanner listeners • Features basic construction procedures for both receive and transmitting antennas • Includes information on dipole variation, vertical variations, beams, long wires and other special types and configurations • Details proper testing procedures • Discusses advanced antenna designs, including beams, phased elements and other types • Provides information on band frequencies, time considerations and sources of data. 162 pages 210 x 280mm

Order Code MFJ38 CMF ©1986 **\$39.25**

Antenna PatternWork Sheets

Order Code BR902 Packet of 10 sheets **\$3.00**
Standard scale Smith Chart

with both impedance and admittance co-ordinates in normalised form. Printed in two colours for easier use. Ideal for matching networks and ladder structures

Order code BR900 Pack of 10 Sheets **\$6.00**
Standard scale Smith Chart

with one set of co-ordinates for impedance or admittance plotting, the standard Smith Chart

Order code BR901 Pack of 10 Sheets **\$6.00**
Expanded scale Smith Chart

for maximum VSWR of 1.7. Ideal for high resolution antenna work. One set of co-ordinates for either impedance or admittance plotting

Order code BR903 Pack of 10 Sheets **\$6.00**

73 Dipole and Long-Wire Antennas

Antenna experimentation offers a unique opportunity to make the amateur radio hobby more than a operational spectator activity. All you need are telescoping masts, antenna wire, insulators, ingenuity, and a desire to experiment.

Antenna types from dipoles to rhombics are covered in this book, and the topics are arranged in a sequential manner from simple constructs on to more and more complex ones. However, if the reader is interested in just one type of antenna, he or she can go directly to that type. The necessary mathematics are included, but no extensive knowledge is required to build the antennas described. Simple test instruments are shown which will enable the reader to obtain maximum performance from his or her antenna.

73

Dipole and Long-Wire Antennas

\$26.00

73 Vertical, Beam and Triangle Antennas

Antenna types from simple dipoles through verticals and Yagis to quad and triangle beams are covered in this book, and the topics are arranged in a sequential manner. However, if the reader is interested in just one particular type of antenna, he can go directly to that type.

The necessary mathematics are included, but no extensive knowledge is required to build the antennas described. Simple test instruments are shown which will enable the reader to optimize the designs and obtain maximum performance from his antenna.

Many of these antennas compete with (and some surpass) the performance of commercial beams. The serious experimenter will find in 73 Vertical, Beam, and Triangle Antennas exactly what he or she needs.

73

Vertical, Beam and Triangle Antennas

Order Code MFJ3303

\$26.00

SATELLITE & SPACE BOOKS



THE SATELLITE EXPERIMENTER'S HANDBOOK

By Martin R. Davdoff, K2UBC, 2nd edition, published 1990. You'll find this expanded and revised second edition a fascinating new look at how you can put orbiting spacecraft to practical use. Discover the basics of satellite communications, the latest series of spacecraft and the antennas and radios needed to hear them or communicate through them. Explore the sample problems and tutorials on calculating when a satellite will be in range. Aside from amateur radio satellites, this edition discusses weather, TV broadcast and other spacecraft. 11" x 8.5" 350 pages.

Order code BR177 ©1990, ARRL 2nd ed.

\$52.00

SATELLITE ANTHOLOGY

3rd edition 1994. The ARRL Satellite Anthology gives you the best articles from QST magazine to enrich your operating enjoyment. Learn about all active satellites from OSCAR 10 through OSCAR 27—and beyond. You'll discover how to track satellites, work satellite DX, explore the digital microsatellites and use the Russian "easybirds." Use this handy volume alone or as a supplement to The Satellite Experimenter's Handbook (above). Timely information appears on the use of digital modes, tracking antennas, RUDAK, microcomputer processing of telemetry & where to find additional OSCAR information. 125 Pages 8.5" x 11".

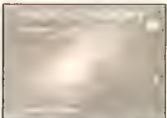
Order code BR 476 ©1994 ARRL 3rd ed.

\$26.00

RADIO ASTRONOMY

John D. Kraus, W8JK's classic teaching text and reference book which has served a generation of the world's radio astronomers. New sections on:

- Two-dimensional aperture synthesis
- Off-axis performance of parabolic
- Holographic measurements • Phase closure mapping • FET low-noise amplifiers • Schottky diode mixers • Jupiter and Io • Interstellar molecular clouds • Comets • The Cygnus X-3 outburst • SS433 • The galactic nucleus • Synchrotron self absorption • QSO variability • Black objects • Gravitation lensing • Plus an entire chapter on pulsars.



Order Code BR262 ©1986 Quesar Publications

\$79.00

THE HIDDEN SIGNALS ON SATELLITE TV

This third up-dated edition is devoted entirely to hidden, non-video services relayed by communication satellites. There is audio and teletype news services, high-speed data systems, teletext, and video stock market and financial services, to name just a few. Receiving these signals is really very easy if you know how. This book unlocks these services for you with complete system descriptions that include diagrams and layouts as well as service listings by satellite. You also get a brief history of satellite communications, a description of multiplexed audio and data systems and a complete listing of the various types of transmissions. This book should be in every TVRO owner's library. New enlarged third edition (just released) has hundreds of diagrams and photos.

By Thomas Harrington contains 238 Pages (12" x 280mm)

Order Code BR001

\$40.00

SPACE RADIO HANDBOOK

Space exploration by radio is exciting and is open to anyone. Equipped with receivers and transmitters, computers and telescopes, thousands of individuals, schools and clubs are following everything that goes on in space. Some are communicating via satellites or by bouncing signals off meteor trails or even the moon, some are listening to comets or taking part in space experiments, while others are listening to radio signals that have taken millions of years to come from distant galaxies.

Space Radio Handbook shows you how it's done, and the equipment you will need. It covers the whole field of space radio communication and experimentation, including meteor scatter, moonbounce, satellites and simple radio astronomy. A valuable feature is a collection of experiments of interest to those wishing to explore the many educational possibilities. If you are ready to use radio to explore beyond the atmosphere, let this book be your companion.

Order Code BR439 ©1991 RSGB

\$47.00

WEATHER SATELLITE HANDBOOK 5th ED 1994

Dr Ralph Taggart, WB8DOT. Expanded and revised in 1994 to reflect today's weather FAX satellite technology. For anyone with an interest in electronics, meteorology, earth science and computer science. Packed with digital display projects and information not just theory. New technology contained in this fifth edition will allow you to track one of the most unpredictable forces in the world—the weather—more accurately than ever before. And all of the software in the book is also available from Daycom. 11" x 8.5".

Order code (Book) BR324 4th Ed ©1994 ARRL

\$52.00

Order code (Software) BR324A

\$22.00

SPACE ALMANAC

A galaxy of information! The Space Almanac, written by Anthony R. Curtis, K3RXX, editor of Space Today, is an extraordinary book which captures the breathtaking recent news from space, freshly compiled and written. It includes approximately 40 pages on amateur radio satellites. The Space Almanac is a major handbook featuring almost anything you could want to know about man's trips to the stars. Here's what you get:

- 500,000 words in 960 pages! • Tens of thousands of facts • Hundreds of stories, reports and descriptions • Comprehensive space history calendar • Lists of future space plans from around the world • Scores of tables, charts, maps, diagrams, histograms, drawings, photos, calendars, timetables • Covers space from Earth to the edge of the universe in seven major sections • Astronauts, space stations, shuttles, rockets, satellites, solar system and deep space.

Order Code BR299 ©1992 2nd ed.

\$50.00

SCRAMBLING AND DESCRAMBLING SATELLITE AND CABLE TV

Scrambling and descrambling technologies are revolutionizing television broadcasting by allowing pay-TV programs to be relayed directly to consumers via satellite, over-the-air, or over cable networks.

Until now, technical information (and misinformation) regarding video encoding and decoding technology has been available to the consumer primarily through the "private underground." This book will take the mystery out of video encryption, and educate the interested reader in a manner which is clear, concise and entirely reliable.

Order code BR14 ©1986 2nd ed.

\$40.00



SATELLITE BOOKS

KU-BAND SATELLITE TV Theory, Installation & Repair

By Frank Baylin and Brent Gale

A clear presentation and explanation of worldwide Ku-band satellite television. This fourth edition has been expanded with additional sections on small dishes, European DBS satellites, TV, flat plate antennas, actuators, LNB and satellite receiver electronic design, worldwide scrambling technologies, LNB analysis, fixed antenna installations, interfacing receivers and decoders and aligning a polar mount with a compass.

The book explains the background of Ku-band reception equipment with a detailed survey of frequency allocations for broadcast satellites around the globe. Retrofitting Ku-band components onto C-band TVs is discussed with a step-by-step examination of multiple-receiver systems and distribution networks. Existing North American, Soviet, European, Japanese and Australian Ku-band broadcast systems are outlined and, finally, a consistent and comprehensive method of troubleshooting and repairing TVRs, detailed description of different types of test equipment.

Order Code BR12 4th ed. **\$60.00**

THE 'HOW-TO' OF SATELLITE COMMUNICATIONS

This new book by Dr Joseph Pelton, a seasoned veteran of the industry, is a brilliant excursion through the world of satellite communications. For any serious user of satellite services, it gives even a novice the knowledge to design, evaluate and purchase any type of data, audio or video services. 250 pages/ photos. Topics include:

- How geosynchronous satellites work
- The design, construction or purchase of satellite capacity
- The fundamentals of earth station operation
- Globe and SDN standards
- One & two-way spread spectrum VSATs & interactive technology
- How and why to buy satellite networks and services
- Voice and data networks
- Video services and digital television
- The future of satellite communications

Order Code BR15 01991 **\$49.00**



WORLD SATELLITE TV AND SCRAMBLING METHODS

By Frank Baylin, Richard Maddox, John McCormack

This thorough text is a must-buy for technicians, satellite professionals and do-it-yourselfers. The design, operation and repair of satellite antennas, feed horns, receivers and transmitters is examined in detail. An in-depth study of scrambling methods and broadcast formats is a backdrop to a discussion of all American and European current satellite TV technologies including the VideoCipherII, QAM, Onor, FilmNet, Sky Channel, EuroCipher, DZMAC, BSB and Telecable Payview. Circuit and block diagrams of all components are presented and clearly explained throughout the book. This expert guidance on testing, servicing and tuning is complemented by a wealth of detailed illustrations. 356 pages, 220 x 280mm, over 200 photos, diagrams, wiring, schematics, tables and appendices.

Order Code BR11 01991 2nd ed. **\$76.00**

SATELLITE OFF-AIR & SMATV

By Frank Baylin, Steve Berkoff and Tim Morris

A comprehensive study of satellite master antenna TV (SMATV) systems. This thorough manual clearly presents the concepts behind private cable systems as well as technical details of construction and operation. Private cable systems are installed in apartment complexes, hotels, motels, hospitals, caravan parks and auditoriums, as well as in many other multi-unit environments.

This book explores the background and history of this rapidly-evolving field. Off-air and satellite head ends, and all components from antennas to processing and mixing electronics are studied in detail. The chapter on distribution systems explores the components required to supply a high quality signal to every television set. Numerous examples are provided as illustrations of each stage of design. Complex design issues such as inserting locally-originated signals, two-way services and satellite audio reception are also studied. The chapter on system operation presents methods to manage one or more systems as well as a logical approach to troubleshooting.

258 pages, 215 x 280mm

Order Code BR13 **\$80.00**



OPERATING ... DX ... SHORT WAVE LISTENING



THE ARRL OPERATING MANUAL

Fourth edition, 1991. The ARRL Operating Manual is the most complete book about amateur radio on the air operating ever produced. If you really want to be in on what is happening in amateur radio today, get a copy of The ARRL Operating Manual. In the operating award chapter 88 popular operating awards are described and illustrated in full color. Other topics covered include: • Short wave listening • The amateur radio spectrum • Basic operating • Antenna orientation • DXing • Operating DXing / DXpeditions • Emergency Communications • Image communications • Contests • Operating awards • RTTY communications • Packet radio • FM and repeaters • Satellites • VHF/UHF operating • Reference section: 8" x 11", 125 inches thick.

Order code BR192 01991 ARRL 4th ed. **\$48.00**

THE RSGB OPERATING MANUAL

This most extensive book from the RSGB contains much information of use to all amateurs. It contains chapters on: • Setting up a station • Operating practices and procedures • DX • Contests • Mobile, portable and repeaters • Amateur satellites • RTTY • Slow-scan TV • Special event stations. It also contains eight appendices including: • DXCC counter list • Worldwide legal time • Amateur frequency allocations • Foreign language phone contacts • Standard frequency stations • Collig list • Continental and regional maps.

Order Code BR359 01985 RSGB 3rd ed. **\$31.00**

RADIO AURORAS

By Charlie Newton G2FKZ. Published by the RSGB, 1st Edition 1991, this book tells all you would ever want to know about amateur radio communication by means of Aurora propagation. It gives a readable account of what causes Auroras, how they are created and how to best use them to work DX. There are seven chapters and an index. Chapter titles include: • How an Aurora begins • The sun's part • Magnetic fields of the Earth and Sun • How an Aurora comes about • The problems of field aligned propagation • Auroras on bands other than two metres • An analysis of amateur work during Cycle 21 and comparison with Cycle 19 • The bag storm of 13/14 March, 1989. This book is a 'must read' for anyone interested in an in-depth study of radio wave propagation.

Order code BR381 01991 RSGB 1st ed. **\$30.00**

THE SHORTWAVE PROPAGATION HANDBOOK

2nd Edition — Revised 1990. By George Jacobs and Theodore J Cohen. These two leading authorities on propagation have teamed up to produce what is clearly the definitive work for forecasting conditions. For the first time anywhere, propagation is explained in simple language so the average reader can fully understand, use, and produce their own propagation data. This book truly is a 'must read' for the radio amateur and shortwave listener, and all others who make use of the shortwave radio spectrum.

The information contained in this book should significantly enhance one's ability to understand and to make better use of the ionosphere. We feel that this book is one of the most useful — and usable — volumes available today on the subject of propagation. 150 x 200mm, 150 Pages.

Order code BR268 2nd ed. 01990 CQ Publications **\$22.00**

THE DXCC COMPANION

By Jim Keenan, KRTS

The newcomer guide to DXing or how to work your first hundred countries. A very readable little volume full of useful hints about how to work the DX and not make enemies. Discusses QSLing, equipment, antennas, propagation and lots more in a very easy to understand way.

Order code BR345 **\$16.00**

PASSPORT TO WORLD BAND RADIO New 1994

World band radio explodes with hundreds of programs you can begin to find on ordinary radios or TV. From the haunting island music of Radio Tania to the incompete reporting of the BBC, it's a broadcast menu that's one part Newsweek, another part National Geographic.

There is a whole world just waiting for you, day after day. Order your new 1995 edition of Passport to World Band Radio today. You won't believe what you've been missing. Includes a radio buyers guide and an extensive listing of broadcast stations country-by-country.

1993 edition pictured above — 1995 edition is due in stock November 1994

Order code BR346 **\$48.00**

MAIDENHEAD LOCATOR WORLD ATLAS

The ARRL World Grid Locator Atlas (Maidenhead Locator) contains 19 maps listing all 32,000 Maidenhead locator squares. Also there is a very complete index of all world major cities to make it easy to find the correct page, a quick-to-look-up world map divided into 324 fields, and a BASIC computer program listing for finding direction and distance. Every DXer or even casual amateur should have one in the shack. 216 x 279mm.

Order code BR197 ARRL \$13.00

ARRL DXCC COUNTRIES OF THE WORLD

This is the ideal way to record the DXCC countries you've worked and QSLed. * ARRL DXCC Countries List and rules for DXCC certificate. * Contains ARRL DXCC award application form. * An up-to-date listing of the DXCC countries. * A table of self-designated countries. * A table of the allocation of international call sign series. * Rules for obtaining the DXCC award. * Complete tables of all countries with a provision to record countries, mode and frequency.

Order Code BR386 ©1983 ARRL \$5.00

AMATEUR RADIO AWARDS (R5GB)

This third edition gives details of major radio amateur awards throughout the world. Each award is listed in an easy-to-understand format giving all the information on how to achieve the award. An innovation for this edition is the provision of checklists so that the amateur can keep a record of his or her progress.

Order Code BR297 ©1985 R5GB 3rd ed. \$30.00

WORLD PREFIX MAP (R5GB)

A superb wall map (Mercator projection) in full colour and laminated, giving amateur radio call sign prefixes worldwide. 1250 x 630mm, it also shows world time zones, IARU squares and much more.

Order Code BR397 R5GB Plastic Laminated \$25.00

CALL BOOKS for 1995

AUSTRALIAN RADIO AMATEUR CALL

BOOK 1995 Edition

Order Code BR380 WIA 1994 \$12.50

International Call Book 1995

Order code BR339 \$56.50

North American Call Book 1995

Order Code BR338 \$56.50

BUCKMASTER - US & International Call Book

on CD ROM IBM & MAC format... ORDER CODE BR498

ATV ... SSTV

SSTV EXPLAINED

This new book published in 1992 by the BATIC by Mike Wooding G6IQM contains 150 pages providing newcomers to SSTV with the basic knowledge which they will need to build and operate a station. Whether you wish to build a home-brew slow-scan station from designs contained herein, use a commercial converter, or operate a computerised system, this book will have something for you.

Order Code BR199 \$30.00

THE ATV COMPENDIUM

Edited by Mike Wooding, G6IQM, for The British Amateur Television Club

This book will serve to inform those interested in amateur television, practically those of you involved in home construction. Includes projects that use of "state-of-the-art" techniques and devices, without precluding those who do not own sophisticated test equipment or have degrees in mechanical engineering.

Order Code BR270 BATIC \$17.50

AN INTRODUCTION TO AMATEUR TV

A new book from the British Amateur Television Club, edited by Mike Wooding, G6IQM and Trevor Brown, G6JCS. Eight chapters in 154 pages, full of information and circuits on theory and construction.

Order Code BR389 ©1992 BATIC \$20.00

THE BEST OF CQ-TV VOLUME 2

Edited by Mike Wooding, G6IQM and published by the British Amateur Television Club in 1989. This 100-page book is full of ATV projects, 29 in all.

Order Code BR273 ©1989 BATIC \$17.50

TRANSMITTER HUNTING

TRANSMITTER HUNTING

Radio Direction Finding Simplified

In this book by Joseph D. Moore, K0QV & Thomas N. Curlew, W1MAZZ, you'll find out how direction finding can be both fun and profitable. Combine the techniques taught in this book with those used by search and rescue teams and you learn how RDFing can even save lives. Explore the challenge of hidden transmitter hunts and locating causes of accidental and malicious interference to amateur communications. Find out how to get started, about directional antennas, Doppler RDF units, S-meters, direction finding from fixed sites, VHF mobile techniques, hunting from orbit, hunting below 50MHz, how to be the Fox and triangulation using two BASIC programmes, 323 pages 7" x 9".

Order Code BR222 ©1987 4th ed. \$43.00



THE COMPLETE DXER

Since its first publication to rave reviews in 1983, WPKN's masterpiece, The Complete DXer, has become the standard text for the new DX hunter. Now considerably revised and updated, this second edition (1988) fully retains the approach and feel of the original classic while adding two important new chapters of special interest to SSB operators. Every significant aspect of DXing is covered, from learning how to really listen, how to snatch the rare ones out of pile-ups and how to secure that elusive QSL, plus advice on using equipment selection and antennas. Chapter after chapter of reports from the front detail life in the pile-ups, the excitement of landing the new one, the agony of defeat, and all in a manner guaranteed to entertain and educate.

Order code BR194 2nd ed. \$32.00

AUSTRALIAN SCANNER REGISTERS

These registers list, by frequency, many utilities and companies of interest to those with scanners or general-purpose VHF/UHF communications receivers. Each has details of police and other emergency service systems.

Order Code BR355 Victoria \$40.00

Order Code BR355N New South Wales \$40.00

Order Code BR355S South Australia and Northern Territory \$40.00

FERRELL'S CONFIDENTIAL FREQUENCY LIST

Listing all stations by frequency from 1602 kHz to 29 713.5

kHz, the frequencies cover air lights, ships at sea, intercom, embassies, military and coastal stations — in fact, any radio transmission in the utility field, whether by voice, CW or radioteletype and, in addition, this year the CFL also contains new and valuable information about the speed and shift of RTTY stations, as well as the many possible modes that may be used from ASCII through ARC-E3 to FAX. As details have been triple-checked for accuracy up to the moment that the manuscript was submitted to the printer.

Order Code BR387 \$40.00

HISTORY...

SHORT WAVE RECEIVERS PAST AND PRESENT

Written by Fred Osterman, this book contains vital information on over 200 shortwave receivers made over the last 25 years. Includes manufacturer and model, circuit type, year manufactured, size, weight and voltage features, value when new, value used model received and successor as. Most receivers are shown with photos. This book, a great guide to the used receiver market, provides the radio hobbyist with concise information on the value, features, and performance of current and former short wave radios. Prices shown are for the US market but are a good guide for use in Australia. 216mm x 129 104 pages.

Order Code BR253 ©1991 1st ed. \$22.00

THE GOLDEN CLASSICS OF YESTERYEAR

Remember the 6L6 grids, the Heathkit DX100 or Collins fabulous KWM-1? How about the Globe Scout, Hallicrafters, RME, Hammarlund, National HROs, Enac tubes, EF Johnson, WWII rigs. Bugs by Vibroplex, McElroy or Dow Key?

All these famous names plus many more you'll recognize are in *Golden Classics of Yesteryear*. It's all amateur radio in content and it's jam-packed with real-life tales, transmitters, receivers, favourite circuits, telegraph keys, bugs and other amateur topics. There's also EASY TO-BUILD weekend projects, transmitters, receivers and many other projects from the 1920s, 30s, 40s and 50s. 279mm x 216 60 memorabilia pages.

Order code MFJ30 ©1988 MFJ \$21.50

THE BRIGHT SPARKS OF RADIO

This new book by G R Jessop, G6JF, was published by the RSGB in 1990. It covers the heritage years of radio from Marconi to the 'secret listeners' of 1939-45. High quality, hard bound with many photographs and diagrams.

Order Code BR394 ©1990 RSGB \$44.00

FIFTY YEARS OF ARRL

In May 1914 a small band of radio amateurs read by the late Hiram Percy Maxim, W1AW and Clarence Tuska started a national organization and named it the American Radio Relay League. Since that time, the story of amateur radio has been closely identified with the history of the league, the chronicle of amateurs working together. In 1968, the Golden Anniversary of the league, its magazine QST covered the tale in serial form. This material is now gathered here in a historical reference, supplementing but not replacing the only other comprehensive history. Two Hundred Metres and Down by Clinton B DeSoto, 150 Pages 6" x 9".

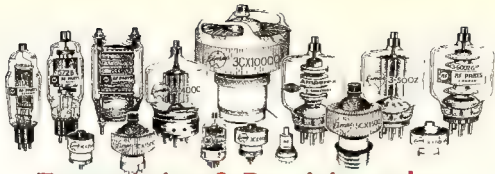
Order code BR196 \$8.00

200 METERS AND DOWN

THE STORY OF AMATEUR RADIO by Clinton B DeSoto was first published in 1936 by the ARRL. At that time Mr DeSoto, then a radio amateur and a student of Johns Hopkins, started to write what no one had ever done for amateur radio — to write its history for the benefit of generations to come. This volume has been reprinted exactly as it was in 1936 and is an invaluable source of amateur history. 6" x 9" 184 pages.

Order Code BR198 ©1991 ARRL \$20.00





Transmitting & Receiving tubes

2021		\$30.25	6DT6	\$15.32	810	Penta	\$268.00
5AR4		\$29.85	6DX8	\$18.73	811A	PENTA	\$41.90
5R4G	Soviet	\$17.85	6EA8	\$20.85		Matched Pr	\$87.80
5R4GB		\$35.85	6EB8 / 6GN8	\$22.35	812A	PENTA	\$68.85
5U4G	Soviet	\$17.85	6EJ7 / EF184	\$19.65		Matched Pair	\$155.00
5U4GB / 5AS4A		\$32.85	6ES8 / ECC189	\$18.34	813		\$35.00
5Y3GT		\$16.85	6EW6	\$15.32	833A	PENTA	\$215.00
6AG7		\$20.85	6FQ7 / 6CG7	\$20.96	833C	PENTA (graphite)	\$248.25
6AL5 / EB91		\$15.72	6GH8A	\$31.31	5763	GE/RCA/SYL	\$52.27
6AM8A		\$15.32	6GJ5	\$20.44	5894	PENTA	\$117.40
6AN4		\$15.32	6GK6	\$31.28	6146B	GE	\$77.00
6AN8A		\$30.65	6GM5	\$35.85	6146B	National/Penta	\$47.85
6AQ5		\$9.69	6GT5	\$49.35	6550A	GE	\$87.00
6AQ5A / 6HG5		\$19.65	6GW6 / 6DO6	\$29.87	7199	PHILIPS	\$50.08
6AQ8		\$10.22	6GW8 / ECL86	\$26.85	7289 / 2C39BA	Siemens	\$65.00
6AQ8 / ECC85		\$18.73	6GX6 / 6GY6	\$15.32	7558	ECG	\$46.85
6AR5		\$26.07	6HF5	GE	7581 / KT88	GE	\$48.47
6AT6		\$10.22	6HF5	Select Pair	8417	ECG/GE	\$49.65
6AU4		\$13.10	6HFB	\$20.85	8874 / 3CX400A7	EIMAC	\$941.89
6AU6		\$15.62	6HG8 / ECF86	\$15.32	8875	EIMAC	\$1047.86
6AU6A		\$10.22	6HS6	\$26.85	8877/3CX1500A7	PENTA	\$1518.29
6AV6		\$14.41	6JH8	GE	8908	GE	\$65.37
6AW8A		\$15.32	6JS6C	GE	8950	GE	\$54.36
6AX4GTB		\$15.32	6JSC6	Selected Pr	8981	GE	\$65.37
6AX5GT		\$23.55	6L6GB / GC	\$22.14	3-500Z	RFP Premium	\$237.00
6AX5GTB		\$13.62	6L6GT	\$19.65		Matched Pair	\$499.00
6AZ8		\$29.85	6L8 Sel Pr	ECG (Galaxy)	3-500Z	EIMAC	\$372.00
6BA6		\$15.32	6LX6	\$44.41		Matched pair	\$797.00
6BE6		\$17.03	6LX8	\$15.32	3-500ZG	Graphite anode	\$275.00
6BK7		\$15.32	6N8	\$30.65		Matched pair	\$574.00
6BL8 / ECF80		\$11.92	6S2A	\$18.73	4-65A	EIMAC	\$229.25
6BM8		\$20.96	6S4A	\$18.73	4-400C	EIMAC	\$419.70
6BN5		\$42.58	6SK7GT	\$37.47	3CX100A5 / 7289	EIMAC / GE / RCA	\$175.78
6BN8		\$31.31	6SL7GT	\$20.85	3CX400A7 / 8874	EIMAC	\$941.89
6BQ5		\$14.14	6SN7GTB	\$17.85	3CX800A7	EIMAC	\$890.67
6BQ6		\$15.32	6U8A / 6KD8	\$20.85	3CX1200A7	EIMAC	\$1395.02
6BQ7A		\$20.44	6U9	\$9.60	3CX1500A / 8877	PENTA	\$1518.29
6BY5		\$13.62	6V6GT	\$19.00		EIMAC	\$1754.10
6BZ6		\$15.32	6X4	\$19.07	3CX3000A7	EIMAC	\$1866.27
6C4		\$21.81	6X5GT	\$17.13	4CX250B / 7203	EIMAC	\$269.00
6CA7 / EL34		\$19.65	6X8A	\$20.43	4CX250B / 7203	RFP Czech	\$229.00
6CB6		\$15.32	6X9	\$9.60	4CX300A	PENTA	\$353.57
6CD6		\$30.65	12AL5	\$15.32	4CX350A	EIMAC	\$522.69
6CD7 / EM34		\$89.85	12AQ5	\$15.32	4CX1000A7	PENTA	\$1021.67
6CG8A		\$9.64	12AT7A	\$15.32	4CX1500B / 8860	PENTA	\$1290.90
6CL6		\$30.79	12AU6	\$15.32	KT88	PENTA	\$36.00
6CM5		\$13.62	12AU7A	\$15.32			
6CM7		\$13.62	12AX7A	\$15.32			
6CQ8 / 6U8A		\$15.32	12BA6	\$15.32			
6CS6		\$15.32	12BY7A	\$41.85			
6CS7		\$15.32	12BZ6	\$35.85			
6CW4		\$46.37	12BZ7	\$15.32			
6CW5 / EL86		\$18.73	12DO6B / 12GW8	\$24.00			
6CW7		\$30.65	12JB6	\$59.85			
6CX8		\$30.65	572B / T160L	RFP Premium	\$120		
6DJ8		\$12.20		Matched pair	\$252.00		
6DQ6 / 6GW6		\$29.87		Matched quad	\$505.00		
6DR7		\$36.68	807	Ceramic Base	\$11.00		
6DS4		\$46.37	810	Cetron	\$235.26		

TRANSMITTING TUBES

Eimac and Penta Transmitting, Thyratron, and Magnetron Tubes carry manufacturers' limited warranty against defective material and workmanship for 12 months. Defective tubes must be returned prepaid accompanied by original purchase receipt and failure report details. Surplus tubes have a 90 day limited warranty.

TUBE BRANDS

The brands shown in this list are those that were available at the time of printing. Where every effort will be made to supply the brands listed, if you have a requirement that only ONE brand is acceptable then please note this condition on your order, otherwise we will assume that substitutes are acceptable.

R.F. Power transistors & hybrids

VHF/UHF 2750MHz

Type	Po	Freq	Gain	Package	per	Matched
W Range	W	Hz	dB	Type	Each	Pair
MPR207	1	G	8.2	TO-39	\$8.77	
MPR206	10	G	10	145A-09	\$42.77	
MPR212	10	F	9	145A-09	\$50.54	
MPR220	4	F	12	211-07	\$36.29	
MPR221	15	F	6.3	211-07	\$36.29	
MPR222	25	F	6	211-07	\$40.73	
MPR234	40	F	4.5	211-07	\$46.00	\$102.39
MPR226	13	G	6	145A-06	\$16.68	
MPR227	3	G	13.5	TO-39CE	\$19.31	
MPR229	1.5	E	10	TO-39CE	\$41.47	
MPR231	3.5	E	10	145A-09	\$66.85	
MPR233	15	E	10	145A-09	\$41.20	
MPR234	25	E	5.5	145A-09	\$64.70	
MPR237	4	F	12	TO-39CE	\$15.87	
MPR238	30	F	9	145A-09	\$41.47	\$95.90
MPR239	30	F	10	145A-09	\$44.06	\$101.08
MPR240	40	F	9	145A-09	\$47.85	\$108.86
MPR240A	40	F	9	211-07	\$47.85	\$108.86
MPR241	80	F	6.4	316-01	\$171.91	\$71.05
MPR247	75	F	7	316-01	\$77.64	\$61.46
MPR248	80	F	11.3	316-01	\$111.97	\$253.22
MPR250	50	F	4	316-01	\$61.57	
MPR250	5	F	10	TO-220CE	\$29.81	
MPR251	10	F	5.2	TO-220CE	\$37.58	
MPR252	15	F	6.3	TO-220CE	\$37.58	
MPR254	30	F	5.2	TO-220CE	\$40.03	
MPR309	50	H	7	316-01	\$121.16	
MPR314	30	D	10	211-07	\$75.16	\$180.13
MPR314A	30	D	10	145A-09	\$83.31	\$206.05
MPR315	45	D	9	211-07	\$119.22	\$235.96
MPR315A	45	D	9	145A-09	\$84.23	\$182.72
MPR316	80	D	10	316-01	\$161.31	\$398.51
MPR317	100	D	9	316-01	\$167.89	\$368.04
MPR321	1	0	12	244-04	\$69.33	
MPR327	80	H	7.3	316-01	\$160.69	\$336.94
MPR340	8	D	13	TO-220CE	\$38.50	
MPR402	70	C	11	211-11	\$38.76	\$98.12
MPR487	10	F	6	TO-220CE	\$43.85	\$92.01
MPR515	75	J	8	TO-39	\$7.82	
MPR555	1.5	J	10	3170-01	\$7.07	
MPR557	1.5	K	8.0	3170-02Z	\$14.28	
MPR559	0.5	K	8	317-01	\$7.07	
MPR607	1.75	F	11.5	TO-39	\$7.07	
MPR627	5	J	10	305A-01	\$24.82	
MPR629	2	J	9	TO-39CE	\$19.31	
MPR630	3	J	9.5	TO-39CE	\$19.31	
MPR641	18	J	7.8	316-01	\$66.90	\$124.41
MPR644	25	J	6.2	316-01	\$81.80	
MPR646	40	J	4	316-01	\$71.72	
MPR648	80	J	4	316-01	\$87.34	\$186.61
MPR652	5	J	10	244-04	\$41.59	
MPR653	10	J	7	244-04	\$41.59	
MPR654	15	J	7.8	244-04	\$59.81	
MPR660	7	F	5.4	TO-220AD	\$38.29	
MPR732	25	K	8	244-05	\$62.20	
MPR734	8	F	6	240-05	\$128.71	
MPR743	15	K	7	244-04	\$90.71	
MPR743P	15	K	7	319-04	\$147.73	
MPR746	40	K	7	319-04	\$118.63	
MPR753	15	K	7	319-04	\$142.43	
MPR1946	30	F	10	211-07	\$44.06	
MPR1946A	30	F	10	145A-09	\$44.06	
MPR2928	15	G	12	244-04	\$33.67	
SD127E-1	40	F	9	211-07	\$41.60	
SD1441	150	F	5	316-01	\$232.70	
SD1477	100	F	6	316-01	\$194.87	
2N3553-1	2.5	F	10	TO-39	\$8.45	
2N3689	1	H	10	TO-39	\$32.24	
2N4421	1	F	10	TO-39	\$53.03	
2N5520	2	F	13	145A-09	\$77.50	
2N5589	3	F	8.2	144A-05	\$91.46	
2N5590	10	F	5.2	145A-09	\$24.20	
2N5591	25	F	4.4	145A-09	\$43.77	\$88.12
2N5641	7	F	—	1440-05	\$41.47	
2N5642	20	D	8.2	144A-09	\$42.77	
2N5640	2	F	8.2	244-04	\$59.61	
2N5644	2.0	F	8.0	3170-02Z	\$36.29	
2N5645	4	F	8	244-04	\$36.20	
2N5646	10	F	8	244-04	\$51.50	
2N5680	4	F	12	145A-09	\$37.21	
2N5691	15	F	6.3	145A-09	\$36.05	
2N5692	2	F	6.3	145A-09	\$36.05	
2N5693	30	F	5.7	145A-09	\$57.21	\$84.23
2N5694	40	F	4.5	145A-09	\$36.29	\$84.23
2N5697 PNP	40	F	—	145A-09	\$77.58	
2N5695	3	F	7.8	TO-39	\$12.53	

HF (2-30MHz)

Type	Po	Package	Each	Matched	Matched
W	W	Style	Pair	Pair	Dual
MPR401	25	145A-09	\$38.88		
MPR402	20	211-07	\$42.51	\$98.49	\$207.35
MPR416	80	211-11	\$67.02	\$150.33	\$309.72
MPR412A	80	145A-10	\$69.98		
MPR421	100	211-11	\$64.68	\$139.96	\$284.84
MPR422	150	211-11	\$98.40	\$220.30	\$461.34
MPR426	25	211-07	\$50.54	\$114.04	
MPR426A	25	145A-09	\$64.80	\$147.73	\$305.83
MPR427	25	145A-10	\$51.58	\$112.22	\$243.63
MPR428	150	211-11	\$145.78	\$280.00	\$575.96
MPR429	150	211-11	\$116.52	\$258.78	\$543.50
MPR433	12	211-07	\$34.99	\$66.61	\$171.06
MPR435	150	211-11	\$346.06	\$726.00	
MPR448	250	211-11	\$187.91	\$401.73	\$821.61
MPR449	30	211-07	\$58.32	\$120.00	\$264.37
MPR449A	30	145A-09	\$58.32	\$127.00	\$264.37
MPR450	50	211-09	\$33.47	\$80.35	\$165.88
MPR450A	50	145A-09	\$36.95	\$84.23	\$173.95
MPR453	60	211-11	\$44.06	\$102.38	\$215.12
MPR453A	60	145A-10	\$47.95	\$112.22	\$222.90
MPR454	60	211-11	\$36.17	\$86.83	\$154.59
MPR454A	60	145A-10	\$51.72	\$124.88	\$258.92
MPR455	60	211-07	\$28.39	\$61.71	\$129.48
MPR455A	60	145A-09	\$30.99	\$68.97	\$152.92
MPR458	80	211-11	\$46.54	\$123.87	\$258.61
MPR460	80	211-11	\$60.91		
MPR464	80	211-11	\$64.80	\$150.33	
MPR466	40	211-09	\$82.30	\$181.06	
MPR475	12	TO-220	\$20.60	\$54.16	
MPR476	3	TO-220	\$20.62	\$51.72	
MPR477	40	TO-220CE	\$43.14	\$76.48	
MPR479	15	TO-220CE	\$48.73	\$106.26	
MPR485	1	TO-220	\$38.17		
MPR492	90	211-11	\$38.78	\$88.12	\$186.98
MPR492A	90	145A-10	\$59.61	\$136.07	\$285.10
SD1465	75	211-11	\$58.50	\$124.88	
SD1467	100	211-11	\$58.50	\$124.88	
SD22290	80	211-11	\$38.73	\$99.19	
ZSC2879	120	211-11	\$43.95	\$101.71	\$222.64
ZSC2509	15	TO-220CE	\$38.73	\$99.50	
ZSC2697	65	316-01	\$83.37	\$160.43	

SPECIAL HIGH OUTPUT 2-30MHz 12V types

Type	P in	P out	Gain	Package	Price
W	W	W	dB	Volts	Inc. tax
SFR2072	65	211-07	\$53.28	\$73.81	\$200.86
SFR3662	120	211-11	\$64.13	\$140.36	\$312.18
SFR3775	75	211-07	\$35.70	\$76.65	\$162.14
SFR3795	90	211-11	\$38.72	\$84.54	\$174.24
SFR3800	100	211-11	\$42.35	\$84.54	\$189.44

All TRANSISTORS NPN, 12V unless noted
(* = 28V ** = 50V)

RF Power modules

Part Number	Freq Range	P in	P out	BIAS	Price
		mW	W	Class	inc tax
BGY45B	148-174	150	28	C	\$87.50
CA2832	1-200	1	1.6	A	\$142.86
CA2885	40-500	40	2	A	\$182.00
M57704EL	335-360	200	13	C	\$112.28
M57704L	400-420	200	13	C	\$112.28
M57704AH	430-450	200	13	C	\$103.28
M57704H	450-470	200	13	C	\$112.26
M57704SH	490-512	200	13	C	\$112.28
M57706	145-175	200	8	C	\$53.63
M57710A	156-160	200	28	C	\$83.03
M57713	144-148	200	10	AB	\$87.12
M57714	450-470	100	7	C	\$114.53
M57714EL	335-360	100	7	C	\$125.78
M57714H	430-450	100	7	C	\$114.53
M57714UH	470-490	100	7	C	\$125.78
M57715	144-148	200	10	C	\$102.23
M57716	420-450	200	10	AB	\$163.35
M57719H	142-163	200	10	C	\$104.00
M57721M	400-450	1	7		\$124.83
M57726	144-148	200	40	C	\$159.75
M57727	144-148	200	25	AB	\$127.05
M57729	430-470	600	25	C	\$69.40
M57732	144-175	20	7	AB	\$69.03
M57733L	135-160	20	7	AB	\$69.03
M57735	50-54	200	17	AB	\$148.39
M57737	144-148	200	25	C	\$117.40
M57739C	825-851	30	6	C	\$111.64
M57741H	148-180	200	25	C	\$137.85
M57741M	158-168	250	25	C	\$137.86
M57741H	164-275	300	25	C	\$145.20
M57745	805-915	400	13	C	\$143.89
M57745	430-450	300	25	AB	\$188.19
M57747	144-148	200	13	C	\$93.54
M57755	800-898	100	20	C	\$212.96
M57759	890-915	2	0.2	C	\$71.40
M57762	1240-1300	1000	20	AB	\$170.09
M57764	800-825	400	20	C	\$183.69
M57762	825-851	1	7		\$134.66
M57763L	135-160	50	7	AB	\$103.39
M57765L	135-160	50	7	AB	\$136.69
M57767	1240-1300	7	1.5	C	\$125.89
M57768H	450-470	400	45	C	\$222.53
M57768L	400-430	400	45	C	\$229.55
M57768M	430-450	400	45	C	\$229.55
M57768MA	144-148	200	7	AB	\$56.56
M67705MA	430-470	20	5	C	\$66.56
M67705H	470-512	20	5	C	\$66.56
M67711	1240-1300	1000	16	AB	\$154.66
M67715	1240-1300	10	1.5	AB	\$125.89
M67727	144-148	500	60	AB	\$260.99
M67748L	135-150	20	7	C	\$85.26
M67755L	134-150	2	7	C	\$100.99
M67761L	135-160	400	45	C	\$193.28
MHW996	1240-1300	10	1.5	C	\$147.62
MHW999	10-400	1	0.9	A	\$128.67
NIW591	1-250	1	0.7	A	\$101.64
MHW592	1-250	1	0.7	A	\$112.89
MHW710-1	400-440	250	15	C	\$147.62
MHW710-2	440-470	250	15	C	\$147.62
MHW710-3	470-512	250	15	C	\$147.62
SAU4	430-450	200	10	AB	\$120.00
SAV6	154-182	200	28	C	\$121.00
SAV7	144-148	200	28	C	\$103.00
SAV12	144-148	150	5	C	\$56.87
SAV17	144-148	400	50	C	\$149.00
SAV24	144-148	400	50	C	\$163.80

NOTE: Power ratings are for CW operation. SSB/PEP ratings are typically 50% higher. All transistors NPN, 12V, unless noted, i.e., *28V = 28V Maximum. Size of eight or sixteen transistors are available on request.

*Frequency range codes: C = 27-50 MHz, D = 30-200 MHz.

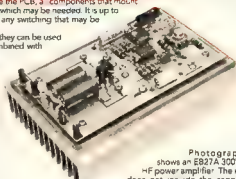
for the home brewer...

Motorola app note POWER AMPLIFIERS - short form kits

These HF power amplifier kits offer a wide range of amplifiers in short form kits. All of these kits include the PCB, all components that mount on the PCB, the active devices and any necessary unusual wire such as high temperature enamel or Teflon which may be needed. It is up to the builder to provide heat spreading, heat sinking, forced air cooling, connectors, output filtering and any switching that may be necessary.

All of these power amplifiers are linear units with any necessary bias stabilisation provided on the PCB, thus they can be used in any desired mode including CW, SSB or FM. When used well below their maximum ratings and combined with appropriate filtering they are eminently suited to testing applications.

Applications for these kits include amateur, commercial or instrumentation HF amplifiers, FM broadcast amplifiers and drivers and amateur or commercial VHF amplifier systems.



Photograph shows an E827A 300W HF power amplifier. The kit does not include the copper heat spreader plate or the heatsink. All other components, including pre-wound and assembled transformers are included in all of the kits. Individual components and selections of parts are available for all models, please enquire for details. All of these kits are strictly in accordance with the original Motorola application notes with additional details and assembly notes included where necessary. Only top quality components and materials are used in assembling these kits!

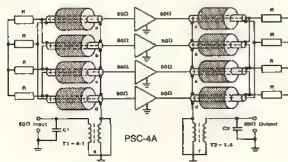
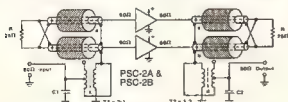
Application Note	Frequency Range	Power In	Power out	DC Supply	Devices used	Price Inc tax
AN779L	1.6-30	+6 dbm	20W	12.5V @ 5A	2 x MRF475 2 x MRF476	\$201.00
AN779H	1.6-30	+10 dbm	20W	12.5V @ 5A	MW501 2xMRF433	\$224.00
EB63	2-30	1-5 W	140W	13.6V @ 22A	2xMRF454	\$213.00
AN762	1.6-30	1-5W	140W	13.6V @ 30A	2xMRF454	\$224.00
EB27A	2-30	18-20W	300W	28V @ 20A	2xMRF422	\$334.00
AN758	2-30	15-16W	300W	50V @ 14A	2xMRF429	\$391.00
EB104	2-30	5W	600W	40-50V @ 18-20A	2xMRF150	\$1,064.00
AR313	10-150	15W	300W	12-28V @ 22A typ	MRF141G	\$920.00
AR306	10-175	15W	300W	40-50V @ 12-15A	MRF151G	\$920.00

High Power splitter / combiners

In the mid-1970's Motorola released an application note, AN-749, by Hege Granberg with details of the design of hybrid power splitters and combiners for HF use. These three types are produced to Granberg's original designs and have been successfully used in many applications over the years.

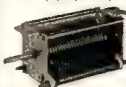
Careful construction using uncommon materials is necessary to ensure the best possible performance from combiners such as these, for this reason all types are supplied complete assembled and tested. Whilst provision is made for power balancing resistors they are not fitted. See Motorola RF Devices data book, Vol 2, pp 7-98 — 7-106 for more details.

Type Number	Application Notes	Power Rating	Price Inc tax
PSC-2A	Motorola AN749 AN758	600W PEP	\$168.00
PSC-2B		1000W PEP	\$192.00
PSC-4A		1200W PEP	\$216.00



Transmitting Capacitors

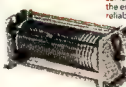
High quality capacitors for linear amplifiers are hard to find, but now you can use these top quality MFJ capacitors in your own projects at retail prices.



Stock Number	Value pF	Depth	Power Rating	Used In	Price Inc tax
CH48	300 pF	43 mm	300 W	MFJ-901	\$24.30
CH49	248 pF	987 mm	30W	MFJ-909	\$79.20
CH50	250 pF	290 mm	3kW	MFJ-905	\$98.00
CH51	250 pF	165 mm	1.5 kW	MFJ-902	\$59.80

High Power roller inductors

These high performance roller inductors are the same as those used in the MFJ antenna tuners across the entire HF spectrum. They are extremely robust and reliable units for any home-brew application.



Stock Number	Power Rating	Used with	Used In	Price Inc tax
CO297	3 kW	CH49	MFJ-909C	\$128.40
CO298	2 kW	CH50	MFJ-905	\$146.70

Broadband ferrite transformers



Stock Number	Core Length	Price Inc tax
TC43	8mm	\$7.20
TC44	13mm	\$7.30
TC45	19mm	\$9.00
TC46	25mm	\$9.00
TC47	32mm	\$10.20

High Power splitter / combiners



Stock Number	Type	Core (mm)	Power PEP	Price Inc tax
TC48	Input	6x13	70W	\$7.20
TC49	In/Output	13x13	300W	\$9.00
TC50	Output	8x29	1500W	\$16.80
TC51	Output	13x29	2500W	\$11.80

Coax connectors and cable...

BNC clamp style cable male



PC34 \$3.60
Standard clamp connector for RG58 style 50Ω cable

PC35 \$3.60
Standard clamp connector for RG59 style 75Ω cable

PC36 \$6.78
Square cut (easy assembly) cable plug for RG58 50Ω

PC37 \$6.78
Square cut (easy assembly) cable plug for RG59 75Ω

PC38 \$26.11
Standard clamp plug for RG178 submini 50Ω cable

PC158 \$8.28
Standard clamp plug for RG174 submini 50Ω cable

BNC clamp type for large cables



PC171 \$5.35
Clamp cable male for RG213 and similar 50Ω cable

BNC Crimp type cable male



PC39 \$5.94
Crimp plug for RG174/179 submini 50Ω cable

PC40 \$3.18
Crimp plug for RG58 style 50Ω cable

PC42 \$2.76
Crimp plug for RG58 & RG59 cable with captive contact

PC156 \$3.90
Crimp plug for RG174 submini 50Ω cable

BNC bulkhead mount male



PC129 \$9.36
Single hole mount male

BNC flange mount male



PC136 \$6.60
Sma: flange male

BNC clamp type cable female



PC28 \$4.45
Standard clamp cable female for RG58 style 50Ω cable

PC29 \$5.98
Standard clamp cable female for RG59 75Ω style cable

BNC crimp type cable female



PC999 \$
Free cable female for RG58 style 50Ω cable

BNC bulkhead clamp female



PC30 \$5.78
Crimp type bulkhead female for RG58 style 50Ω cable

PC31 \$5.35
Crimp type bulkhead female for RG59 style 75Ω cable

BNC bulkhead crimp female



PC33 \$5.62
Crimp type bulkhead female for RG58 & RG59 style cables

PC170 \$5.66
Crimp type bulkhead female for RG58 style 50Ω cables

BNC bulkhead mount female



PC24 \$2.28
Bulkhead mount female for thin panels

PC25 \$5.46
Bulkhead mount female for thin panels

BNC flange mount female



PC32 \$3.80
Standard flange mount female

BNC in-series adaptors



PC44 \$3.02
Female-female adaptor



PC106 \$5.62
Female-female bulkhead mount adaptor

PC107 \$6.54
Female-female bulkhead mount adaptor - insulated



PC43 \$9.07
Male-male adaptor



PC45 \$8.76
BNC F-M-F tee adaptor



TNC cable male connectors



PC151 \$2.81
Standard clamp male for RG58 style 50Ω cable



PC161 \$3.66
Crimp type cable male for RG58 style 50Ω cable



TNC female connectors



PC175 \$3.32
Bulkhead female



PC176 \$5.65
Flange female

Type N clamp type cable male



PC54 \$6.50
Clamp type cable male for RG58 style 50Ω cable



PC53 \$8.50
Clamp type cable male for RG213 style 50Ω cable



PC186 \$15.00
Clamp type cable male for RG178 and RG179 submini cables

Type N crimp type cable male



PC137 \$5.16
Crimp type cable male for RG58 style 50Ω cable

PC152 \$14.22
Crimp type cable male for RG213 style 50Ω cable

Type N flange mount male



PC138 \$20.83
Standard flange mount male

Type N cable female



PC169 \$10.20
Clamp type cable female for RG213 style 50Ω cable

Type N bulkhead female



PC56 \$6.48
Standard single hole female

PC52 \$26.92
Single hole mount for 44in hole - same size as BNC connector

Type N flange female



PC57 \$6.54
Standard flange mount female

UHF connectors



PC17A \$3.12
Teflon insulated cable plug for RG-213 size cable



PC18 \$0.42
reducer sleeve for RG58



PC19 \$0.42
reducer sleeve for RG59



PC15 \$7.04
Single hole mounting socket



PC16 \$3.54
Four hole flange mounting socket



PC22 \$4.26
Female - female adaptor or joiner



PC20 \$10.37
Female - male - female TEE adaptor



PC23 \$2.27
Male - male adaptor or joiner

CO-AXIAL CABLE

A comprehensive range of co-axial cable for all your RF needs, three types of subminiature for internal and instrumental use, standard sizes in three impedances for communications television and computer use, semi-rigid types for microwave use and low loss cable for long runs at VHF and UHF in communications installations. Note that the low loss types, 9913 sty e and 100FB cables both use special connectors, enquire for details. Connectors for semi-rigid cable are stocked in SMA and type N

Stock Number	RG type	Zo Ω	Loss db/100m @400MHz	Price per mtr
Subminiature PVC insulated				
WB36	RG174	50	68.8	\$1.32
Subminiature TEFLON® insulated				
WB37	RG178	50	85.1	\$2.88
WB35	RG179	75	68.9	\$4.56
Semi-Rigid TEFLON® insulated				
WB57	RG405 085"	50	94	\$14.93
WB56	RG402 141"	50	21	\$14.93
Standard style PVC insulated				
WB38	RG58	50	33.1	\$1.02
WB54	RG213	50	13.4	\$3.76
WB70	9913	50	8.0	\$4.95
WB71	100FB	50	6.8	\$7.62
WB39	RG59	75	20	\$1.44
WB41	RG62	60	17.4	\$1.14

Why not a Ten-Tec?

TEN-TEC



The SCOUT from Ten-Tec gives you full QSK CW operation, superb quality SSB and all the features you need in a compact single band transceiver. BUT you only need to change a small band module to add other bands, pull one out, plug another in, it's that simple. All amateur bands are available from stock for the SCOUT.

SIMPLICITY: For either CW or SSB you just sit down and operate! Master your new radio in only minutes — every feature is right on the front panel making this radio so easy to use it will absolutely amaze you!

SIZE: At half the size of other small transceivers and with much lower power consumption the SCOUT makes mobile and portable operation supremely simple! It's 64W x 184W x 248D size and 2.4kg weight tell the story.

SELECTIVITY: The revolutionary, patented "Jones" filter results in a variable bandwidth 8 pole crystal filter from 500Hz to 2.5kHz at the turn of a knob. No CW filters or options. SSB filters, they are all in the box already!

SMART: Add to all of this a state-of-the-art RISC processor which provides synthesizer like performance with continuous tuning and crystal stability with the exclusive FLS frequency locking system. It also provides built-in 5-50wpm lamark keying and an easy to read digital display.

POWERFUL: The 50 watt output power of the SCOUT is enough to work the world but saves on battery power. Less than 10A required for full output, <4.5A for 5W output and on receive it only needs 600mA.

The SCOUT is just like every other product in the Ten-Tec range. Painstakingly designed and carefully built to an extremely high standard with the highest quality components in the USA. In these photographs you can see that the SCOUT might be small but is built to last through many years of tough service.



Part of the success of the SCOUT is the simple band module, shown here with an American quarter (a bit larger than a 10 cent piece) the module removes a lot of the expense and complication of band switching from the radio, simply pull one out and plug in another!

Add to all of the great features from Ten-Tec is the support you will get from DAYCON who have full facilities for warranty and non-warranty service of Ten-Tec radios, amplifiers and accessories. All Ten-Tec accessories for the SCOUT are carried in stock.

TT-555

SCOUT 555 with one band module of your choice

Band modules for SCOUT

160, 80, 40, 30, 20, 17, 15, 12 or 10metres, each

TT-607 Single paddle key for SCOUT or OMNI-VI

TT-700C Electret hand mic for SCOUT or OMNI-VI

TT-705 Desk mike, coiled cord for SCOUT or OMNI-VI

\$62

\$93

\$87

\$192

\$1199



Arguably the best transceiver ever built for strictly amateur band use — the TEN-TEC OMNI-VI is the culmination of two decades of high performance transceiver engineering. Designed to meet the needs of the serious DX'er and contest the crystal mixing scheme used in the OMNI-VI virtually eliminates phase noise as a factor in receiver performance.

SELECTIVITY is one area where the OMNI-VI excels, with up to 24 poles of cascaded filtering and Passband Tuning, adjustable noise blanker, DSP low pass audio filters and DSP notch filters as well as a manual notch filter the OMNI-VI has a formidable arsenal of interference rejection capability.

Super high performance microprocessor control gives lightning fast QSK for CW, AMTOR & FACTOR, adjustable slow QSK delay, Dual VFO's, ± 10kHz RTT and XIT, clock, lamark keyer, 100 memories and scratch pad with four flexible memory use options as well as flexible frequency entry options, band stacking registers and all of the features you need for serious HF operation.

All TEN-TEC equipment is made in the USA from top quality components and carries a full 12 month warranty. Call for brochures giving complete details or call-in for a try-out today!

TT-563

OMNI-VI Amateur band only transceiver

\$5200

OTHER TEN-TEC MASTERPIECES



DELTA-I - A full high performance 100W transceiver fully synthesised for all amateur bands plus general coverage receiver. Has VDX, speech processing, CW-QSK, Jones J filter, Notch filter, Passband tuning and clock all in a package smaller than most 'amateur' HF transceivers. \$3400

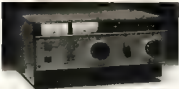
ARGONAUT-II - A full respects identical to the DELTA-I but with 5W maximum output requires only 750mA receive and 3A transmit. \$3100



PARAGON-II - A fully featured, fully synthesised HF radio for all band coverage with general coverage receiver, feature packed! Call for brochure \$5200



HERCULES-1 - A music bound 500W output no-tube solid state amplifier for 1.8-30MHz. Lightning fast QSK, and remote control are standard. Needs 80A @ 13.5VDC. \$3120



CENTURION - A full throat 2kW DC input linear with a pair of 3-500Z 6EMAC tubes. Produces 1300W PEP SSB, 1000W CW and 650W RTTY & SSTV. With 50Hz rated power supply. \$4200



TITAN - The ultimate HF linear, a pair of 3CX800A7 6EMAC tubes, with full QSK requires 60-80W drive for 1500 watts output. Fully protected with ducted forced air cooling using centrifugal blower for low noise. \$7400

ICOM *Ham Heaven!*

ICOM has the products that make amateur radio fun, DAYCOM has the service to make it easy! Our new air-conditioned showroom has extensive demonstration facilities for HF, VHF and UHF including all digital modes. You are welcome to 'audition' any ICOM product with accessories of your choice. Full technical support is available on the premises.

CALL for detailed information and prices on all ICOM equipment!



IC-781 The winner in a price/performance ratio for HF radio



IC-765 HF transceiver with AT (Automatic Tuning) and 100W power



IC-736: All the features of the latest HF technology with built-in power supply, automatic antenna tuner AND a full 100W on 6 metres
IC-736: Combines the performance features of the IC-736 with the convenience of 13.8V operation (no 6 metres)



IC-728: The basic HF transceiver with 26 memories, Pass band tuning and great performance!
IC-729: Just like the IC-728 but with six metres.

TRADE-INS

Your clean used equipment is always welcome as a trade-in. Please contact us for valuations.



IC-820H: Superb performance in a dual band 2m/70cm all mode transceiver for voice, satellite or packet



IC-970H: Deluxe 2m/70cm multi-mode base station with power supply, can have 23cm, 13cm and 25-950MHz receiver added. Satellite features built-in



IC-275H, 475H, 575H: The definitive mon-band multi-mode radios, still going strong



IC-2700H: Icom's best mobile ever with remote mount front panel and optional infra-red remote control



IC-R7100: 25 2000MHz receiver with computer remote control, keypad entry and great overall features for commercial or serious listener use.



IC-R72A: 30kHz-30MHz receiver



IC-281H, 481H: 2m and 70cm mono-band mobiles with cross band receiver, full duplex cross band operation and 9600bps packet ready
IC-2340H: 2m/70cm dual-band, same styling as IC-281H but for two bands

ASK ABOUT:

NEW 3 year warranty available on any ICOM transceiver or receiver.
Packet and multi mode control setup service available with any ICOM transceiver

KENWOOD

HF TRANSCEIVERS



TS-950SDX 150W Tx/Rx ATJ PS, DSP



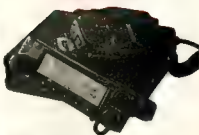
TS-850SAT 100W TX/RX ATU 100mhz



TS-450SAT 100W Tx/Rx, ATU, 100mhz

TS-690S 100W HF/50W 6mtr no ATU

VHF/UHF Mobile



TM-732A 2m/70cm 50/35W Dual



TM-742A 2m/70cm+optional band mobile

CALL for details on Kenwoods new VHF and UHF mobiles and base stations as well as the TH-79 hand held dual bander.

RECEIVER



R-5000 1-30MHz 100mhz

HF Mobile TRANSCEIVERS



TS-50S 100W TX/RX compact mobile

TOP TRADES
We'll gladly trade-in your clean amateur gear towards new KENWOOD equipment

This catalogue lists many of the communications products stocked by Daycom Communications Pty. Ltd. It is by no means complete.

Our showroom has most MFJ, Icom, Kenwood and many other Amateur Radio products on display. If you are in Melbourne please call in.

FREIGHT & INSURANCE - Book prices shown here include postage with in Australa. All other products need to have freight and insurance added. For small to medium size items (<7kg) allow up to \$12 freight. Transceivers are generally \$25 to \$30 and antennas \$25 to \$40. To this you will need to add \$5 per \$500 of value for insurance. If you elect not to pay for insurance please say so in writing and the goods become your total responsibility, for loss or damage for whatever reason, as soon as they leave our premises.

PRICES - All prices are subject to change without notice. If you order goods and the price has changed we will advise you before filing your order. All prices quoted in this catalogue include sales tax. Books are tax free, most other items are taxed at 21%.

WARRANTY - All items are covered by a warranty, usually for twelve months. If you need to return goods to us under warranty you must prepay the freight to us. We will return them to you at our expense. All warranty claims must be accompanied by the original sales docket. If there is a warranty card with the goods fill it out and return it immediately or you may not be eligible for warranty support or upgrades. Some special offers are only available to registered owners.

OVERSEAS BUYERS - We will happily ship goods outside Australia. All prices shown here include Australian Sales Tax which you don't need to pay. Please enquire for a firm price and freight quote before you order.

73's from Stewart, VK3ESD and John, VK3ZJF

INDEX

Antenna switches	34	Coaxial connectors	65
Antenna tuners	31	DC outlet boxes	48
Antennas, active	32	DIP oscil ator	30
Antennas, HF beams	36, 37, 38	DSP Noise reduction	49
Antennas, HF mobile	32, 41	Dummy loads	34
Antennas, HF other	32, 33, 37, 40, 41	Frequency counters	52
Antennas, HF verticals	32, 33, 37, 38, 40, 41	HF linear amplifiers	35
Antennas, HF wire	40	Icom equipment	67
Antennas, VHF & UHF beams	32, 36, 39	Kenwood equipment	68
Antennas, VHF & UHF Hand held	33	Lightning arrestors	39
Antennas, VHF/UHF verticals	32, 33, 39, 41	Low pass filters	34
Audio filters	49	Morse code keys & keyers	50, 51
Baums	43	Multi-mode data controllers	45, 47
Books, Antenna	57, 58, 59	Packet accessories	44, 45, 46, 47
Books, ATV	61	Packet data controllers	44, 45, 46, 47
Books, Design information	53, 54	Packet software	44, 45, 46, 47
Books, For beginners	56	Phone patch	48
Books, History	61	Power meters	30
Books, Morse Code	56	Power splitters & combiners	64
Books, Operating & DX	60, 61	Rotators	43
Books, Packet radio	56	Speaker microphones	48
Books, QRP	55	SWR meters	30
Books, RTTY	55	Transistors & hybrids	62
Books, satellite	59, 60	Valves, transmitting & receiving	42
Books, VHF, UHF & Microwave	54, 55	VHF & UHF power amplifiers	42
Clocks	48	VHF & UHF preamplifiers	36
Coaxial cable	65	WeFAX, FAX & RTTY decoder	48

DAYCOM

COMMUNICATIONS Pty. Ltd.

**37A Fenton Street, Huntingdale
R.O. Box 206, Oakleigh, 3166**

**Bankcard, MasterCard
& Visa all welcome**

**Phone (03)543-6444
FAX (03)543-7238**

Book Review

The ARRL Antenna Book

(17th Edition)

Edited by R Dean Straw

Published by ARRL 1994

ISBN: 0-87259-473-4

Paperback 736 pages, 277 mm by 206 mm, plus a 1.44 MB disk.

Reviewed by Evan Jarman VK3ANI

This is a new edition of the ARRL antenna handbook, one of the most read books in amateur literature. You know, from previous editions, what to expect before opening it. This is one of the benchmark publications of any amateur's library. The only question to ask is, how do you improve a good book?

Antenna theory and practice is common to all facets of amateur radio. It is the area where improvements can be made to a station by a "home brewer", without specialised equipment. Also, the changes can be dramatic, with less effort than in other areas. It is the area of greatest interest to amateurs. It is also the most diverse. An ideal area for a reference book.

This edition concentrates on the practice of antenna construction starting from the basis of antenna type. There are fifteen chapters, each concentrating on a particular antenna type. They are Loop, Limited space, Multiband, Multielement, Broadband, Log periodic, HF Yagi, Quad, Long wire and Travelling wave, Direction finding, Portable, Mobile and Maritime, Repeater systems, and VHF/UHF and Space communications. These are broad topics ensuring that every commonly, and most uncommonly, used antenna is described. Each is dealt with in a pragmatic style. Mathematics is kept to a minimum to make it easier to read. Areas such as log periodic arrays require knowledge of what a logarithm is and they do use the occasional inverse trig function. Where used, complex numbers (eg impedance) are resolved into real (eg resistance) and imaginary (eg reactance) components. These are handled separately to simplify understanding.

The new edition contains changes in most chapters. One, the chapter on HF Yagis, has been completely re-written. The section on performance optimisation is very good. It starts with the design goals, then examines the effect of changing dimensions, and concludes by examining a large number of designs. This allows the reader to design a Yagi either from scratch or by using one of the set designs.

This edition also contains a 1.44 MB floppy disk of computer software. It is for

IBM/C personal computers using DOS. There are programs on gamma match design, element taper, propagation, transmission lines and Yagi design. The programs are generally text display and the program on elevation is of use only in the USA. The gems in the software are the Yagi programs, in particular the Yagi analyser. The program allows you to go through the optimisation of a Yagi described in the book, at the touch of a button. It includes a library of designs to choose from. The display is graphical (and well done) using a EGA/VGA monitor. However, it can be modified for Hercules or CGA. It is a good example of a program that is easy to use and easy to interpret.

The emphasis in the book appears to be on practical understanding. It is a reference book. There is an enormous amount of material. Years of experience from many sources. Each of the chapters makes liberal use of diagrams, graphs, tables and photographs. This makes it easy to understand what is being described. It was easy to quickly understand the principles of the

"Telerama" even though I had never heard the name before.

Using the index, it was easy to locate all my favourite topics. They had all the detail required. Many had references to other articles, for further study. All the topics that I could think of were included. The one topic that I felt should not have been included, was not. That particular antenna is still referred to in some magazines even though it has been described in technical literature as "a waste of good coax". The job of sifting wheat from chaff is protracted and obviously still done. It is always reassuring to know that you can rely on this book as authoritative.

The first edition that I purchased was very long on theory, particularly transmission line. This edition has concentrated more on the practice. The change has not been radical, more evolutionary. Theory is included to balance the how with the why, but does not dominate.

The chapters on ancillary topics are still included. They are Safety first, Ground effects, Antenna selection, Transmission lines, Coupling transmitter to the line, Measurements and Smith chart calculations. All have the detail that one expects of the book.

This is a new edition of an old favourite. It has been one of the best references in the past. The editor has incorporated change and kept the book as an authority as technology improves. The publishers clearly want this book to continue as the definitive reference in the amateur's library. **ar**

WIA News

Boost to SMA Liaison

Liaison with the SMA at Federal level will encompass a more cohesive team approach following a decision of the WIA Federal Council at its October quarterly meeting.

The principal SMA Liaison team now consists of Federal SMA Liaison Officer, Gavan Berger VK1EB (appointed at the Federal AGM in May), Federal President Neil Penfold VK8NE, and Federal Vice Chairman Roger Harrison VK2ZRH. For particular meetings where specific knowledge or expertise is required in given areas of the hobby, other people will be called on to participate in meetings with the SMA.

While SMA liaison has, in the past, been conducted with several WIA people occasionally present at various meetings, this new approach is expected to improve communication between the SMA and the WIA and keep the Federal Council more closely associated with activities and negotiations. Federal President Neil Penfold was to seek a team meeting with the SMA Spectrum Manager, Christine Goode, and other senior SMA staffers at the earliest available opportunity with a view to outlining general agendas, issues and approaches for future meetings. It was hoped that this could be done in early December.

Contests

Peter Nesbit VK3APN* Federal Contest Coordinator

Contest Calendar Dec 94 — Feb 95

Dec 2/4	ARRL 160 m Contest	(Nov 94)
Dec 10/11	ARRL 10 m Contest	(Nov 94)
Dec 26 to Jan 28	Ross Hull VHF/UHF Contest	(Nov 94)
Dec 31	Canada Winter Contest	
Jan 1	ARRL Straight Key "Night"	
Jan 7/8	ARRL RTTY Roundup	
Jan 14/15	VHF/UHF Field Day	
Jan 14/15	HA DX CW Contest	
Jan 27/29	CQ WW 160 m DX Contest	
Jan 28/29	UBA Belgium SSB DX Contest	
Feb 11/12	PACC CW/SSB DX Contest	
Feb 11/12	Spanish RTTY Contest	
Feb 18/19	ARRL DX CW Contest	
Feb 24/26	CQ 160 Metre SSB Contest	
Feb 25/26	RSGB 7 MHz CW Contest	
Feb 25/26	UBA Belgium CW DX Contest	

Well, it's hard to believe another year is almost over. Last January, my plans for the year included converting the rig to full QSK, putting up a phased array, finishing a home brew SSB linear, getting started on packet, tracking down some local power line noise, and maybe even writing an article or two for *Amateur Radio* in my remaining "spare time". All this was to be achieved within the constraints of a 60+ hour job, a part-time masters degree, and normal domestic duties! It should be no surprise that the aforementioned tasks remain as intact as ever, and show no signs of abating for some time yet.

Unfortunately, these things have kept me off air more than I would have liked, to the extent of even missing some good contests. However, it's simply a result of priorities, in which family, job, and study are given precedence over the hobby of radio.

I remember visiting a ham years ago, who was renowned for his ability to work DX. He had a large rural property, covered with enormous beams, and would be exchanging S6 reports with DX stations long after they had disappeared into the noise for everyone else. He was on for hours every day, working long path, short path, and every other path imaginable. As I trudged up the side drive, marvelling at the antennas, I was startled by a bark from the kitchen window "HE'S UP THE BACK!" Somewhat taken aback I attempted to exchange pleasantries, but to no avail, so I continued on to the shack where a very pleasant evening was spent chatting about DX, antennas, rigs, and so on.

On the way home, I was troubled by my inability to reconcile the image of my

friend as a top DXer, envied by all, with that of someone whose domestic atmosphere fell somewhat short of Utopia. Perhaps I had arrived on a bad day, or maybe I was reading too much into the event, but it did remind me of the sort of hostility I had witnessed in other households where amateur radio had all but taken over. From that point on, I vowed to always try and keep a healthy balance between amateur radio and other responsibilities of life, even if it sometimes meant skipping the occasional DX opening or contest.

With the Christmas holidays approaching, and the chance to catch up on projects and spend more time on air, let's not overlook the family. As each year passes, those close to us get older, fall sick, or become less accessible one way or another. By all means nurture the on-air friendships, but don't forget that at the end of the day we are just simple human beings, with a need to give and receive companionship with those we love. We are here for so little time, let's make the most of it while we can. The DX will be there tomorrow!

Merry Christmas to all of our valued readers.

Thanks to VK3KWA, LA4YW, The Radio Amateur Club of Canada, CQ, QST, and *Radio Communications*. Until next month, good contesting!

73, Peter VK3APN

Contest Details

The following contest details are supplemented by the "General Rules & Definitions" published in April 1993 *Amateur Radio*.

Canada Winter Contest

Dec 31, 0000z to 2359z Saturday

Amateurs worldwide are invited to join this yearly contest, sponsored by the RAC. Categories are: single operator single band, all band, or all band QRP (5W O/P); and multipoperator. *There are no single mode categories.* Use 160-2 m, CW or phone (SSB, AM, FM etc) On CW try 25 kHz up on the half hour, and on phone 1850, 3775, 7075, 7225, 14175, 21250, 28500. Any station can work any other for credit. For each Canada QSO score 10 points, and each non-Canada QSO 2 points. QSOs with official Canadian RAC stations are worth 20 points (RAC suffix). Note that CW and phone QSOs must be made in the appropriate sub-band to be valid (I expect 160 m is exempt from this rule, due to the absence of coordinated international sub-bands).

Canadians will send RS(T) + province, all others (incl VEO) will send RS(T) + serial. Multipliers (max 12) are counted once per band and mode (ie 12 on 160 m SSB, 12 on 160 m CW, 12 on 80 m CW etc). Provinces are listed later in this column. Final score equals total points x total multiplier. Send logs to "RAC, Box 356, Kingston, Ontario, K7L 4W2. Canada" by 31 January 1995.

ARRL Straight Key "Night"

Jan 1, 0000z to 2400z Sunday

This is a yearly activity project on New Year's Day, for stations using a straight key. It is not a contest, there are no serial numbers, and ragchewing is encouraged. US stations usually congregate 60-80 kHz up from the band edge. Use "SKN" instead of RST in the exchange, to indicate to other stations you are using a straight key. Send a list of stations worked plus your vote for best first heard, most interesting contact etc, by 8 January to: "ARRL SKN", 225 Main Street, Newington, CT, USA 06111.

ARRL RTTY Roundup

Jan 7/8, 1800z Saturday to 2400z Sunday

The object is to contact as many local and overseas stations as possible on Baudot RTTY, ASCII, AMTOR, and packet (attended). More than one digital mode may be used, but QSOs and multipliers are counted once only regardless of mode. The bands allowed are 3.5-30 MHz, on frequencies recommended for digital operation (no 10, 18 or 24 MHz). Categories are: single operator all band (1) max 150 W O/P, (2) more than 150 W O/P; multi-operator single transmitter all band. A maximum of 24 hours operating time is permitted out of the 30 hour contest period. At least two separate rest periods must be taken, each at least 15

minutes long, with the on and off times clearly marked in the log. Listening time counts as operating time.

Exchange signal report and QSO number. WVE stations will send signal report and state/province. Score one point per QSO. A station may be worked once per band for points credit. The multiplier is the total US states worked (except KH6 & KL7), Canadian provinces (including VE8 & VY1), and DXCC countries (except USA and Canada). KH6 and KL7 count as countries. Multipliers are counted once overall, not once per band. The final score is the total points times the multiplier. Check sheets are required for logs with 200+ QSOs. Mail your log and summary sheet by 7 February to: "ARRL RTTY Roundup", 225 Main Street, Newington, CT, USA 06111. Alternatively, logs can be sent on DOS disk, or to the ARRL BBS (203-865-0090), or via Internet to contest@arrl.org.

HA DX CW Contest

Jan 14/15, 2200 Saturday to 2200z Sunday

This popular contest takes place on the third full weekend of January each year. Categories are single operator single or multiband, multioperator single or multitransmitter, and SWL Bands are 160-10 m. Exchange RST + serial number; HA/HG stations will add a 2 letter country code. Codes for each call area are: (1) GY VA ZA, (2) KO VE, (3) SO TO BA, (4) FE, (5) BP, (6) NG HE, (7) PE SZ, (8) BN BE CS, (9) BO, (0) HA SA.

Score six points per HA/HG QSO, and three points for each non-HA QSO outside your own continent. Multipliers are the total HA countries worked per band. Final score equals total points x multiplier. Separate logs for each band are requested. Send logs with summary sheet and declaration within six weeks to "Hungarian Radioamateur Society, Box 86, Budapest H-1581, Hungary".

CQ Worldwide 160 Metre DX Contest

CW: Jan 27-29, 2200z Friday to 1600z Sunday;
Phone: Feb 24-26, 2200z Friday to 1600z Sunday.

The CW and Phone sections of this contest are scheduled for the last full weekend of January and February each year. The object is to contact as many stations worldwide on 160 m as possible. VK to VK contacts are permitted for contest credit. Categories are single and multioperator. The use of packet, a spotting net, or logging assistant makes you multi-op. Suggested DX frequencies are 1830-1835, WVEs will usually operate

outside this window. Look for Japan on 1907-1912.

Exchange RS(T) plus prefix or country abbreviation (WVE will send RST plus state/province). Score two points for contacts with stations in own country, five points with stations in other countries in the same continent (continental boundary as for WAC), five points for contacts with /MM stations, and ten points with stations in other WAC continents.

Multipliers are US states (max 48, KH6 & KL7 not included; Canadian provinces (max 13, as VO1 & VO2 are considered separately); and DXCC & WAE countries including KH6 and KL7. Maritime mobile stations no longer count as multipliers. The final score equals the total QSO points times total multiplier (US states + VE provinces + DX countries). Indicate CW or SSB on the envelope, and mail the log and paper summary sheet to: "CQ 160 Metre Contest, 76 North Broadway, Hicksville, NY 11801". Mailing deadlines are 28 Feb for CW, and 31 March for SSB.

Canadian Provinces & Territories

Because so many American contests count Canadian provinces and territories as multipliers, I thought it would be helpful to list them for once and for all. So, for future reference, please note the following list:

Newfoundland (VO1, VO2); Prince Edward Island (VY2); Nova Scotia (VE1, CY9, CY0); New Brunswick (VE1); Quebec (VE2/VA2); Ontario (VE3/VA3); Manitoba (VE4); Saskatchewan (VE5); Alberta (VE6); British Columbia (VE7/VA7); North West Territories (VE8); Yukon (VY1).

Results of 1993 SAG Contest

(Call/QSOs/points/mult/final score)

CW:					
VK2APK*	178	280	58	16,240	
VK6ZH	136	158	47	7,426	
VK8AV	96	106	35	3,710	
VK4XA	73	73	34	2,482	
VK4TT	68	68	34	2,312	
SSB:					
VK2APK*	112	170	46	7,820	
VK8AV	28	28	21	588	

Results of 1993 ARRL 10 m Contest

Call, Final score; QSOs; Mults; Hrs; Mode					
(A = mixed, B = phone, C = CW, D = multiop); Output Power (A = 5 W max, B = 150 W max, C = more than 150 W)					
VK2APK*	93,024	337	72	36 A B	
VK8BE	1,976	35	19	36 A B	
VK4NEF*	2,600	65	20	36 A B	
VK2ARJ*	5,400	108	25	36 B B	
VK2GAH	1,024	32	16	36 B B	
VK4LW	1,760	80	11	36 B C	

VK4XA*	93,600	390	60	21 C B	
VK2VM	22,196	179	31	9 C B	
VK4IGU	2,304	72	8	36 C B	
VK3EFO	1,548	43	9	36 C B	
VK2QF*	69,688	281	62	36 C C	
VK4TT	54,180	301	45	36 C C	
VK1DX*	114,800	646	82	36 D	

(ops VK1s FF MOJ PJ, VK2s ILK IVK)

VHF — UHF FIELD DAY 1995

Presented by John VK3KWA

The annual VHF/UHF Field Day will be run on the weekend of 14/15 January 1995. The Ross Hull Contest will be in progress at this time and any contacts made for one can be counted for the other. Please remember that the Field Day exchange must include your Maidenhead locator, and that repeat contacts are allowed for the Field Day but not the Ross Hull Contest.

Several minor rule changes have been made in response to comments made by entrants last year. The timing of the Field Day has been changed to correspond as closely as possible to midday local time (within the constraints imposed by our annual mixture of standard and daylight savings times).

The flexible 24-hour period has been dropped because last year most stations packed up 24 hours after the start of the Field Day and there were few contacts to be had on the Sunday afternoon. The rules have also been changed to exclude 24-hour entrants from also submitting six-hour logs. There have also been minor changes to the general rules.

Duration

VK6 only: 0400 UTC Saturday 14 January to 0400 UTC Sunday 15 January. All other call areas: 0100 UTC Saturday to 0100 UTC Sunday. In local time, the starting time is therefore 11 am in Queensland, 12 noon in other eastern states, 11.30 am in SA, and 12 noon in WA.

Sections

- A: Portable station, single operator, 24 hours
- B: Portable station, single operator, 6 hours
- C: Portable station, multiple operator, 24 hours
- D: Home station, 24 hours.

Entrants may submit logs for only one section. Six-hour operation must be for six consecutive hours, starting on the hour.

General Rules

All modes and bands above 30MHz may be used. Contest exchanges should not be made on recognised DX calling

frequencies Repeater, satellite and cross band contacts are not allowed

Operation may be from any location. You may work stations within your own locator square. Each station may use only one callsign. A station is portable only if its equipment is portable

Contest Exchange

RS or RST reports, a three-digit serial number, and your Maidenhead locator. Serial numbers need not be consecutive.

Repeat Contacts

Stations may be worked again on each band after three hours

Scoring

One point per contact. The band multipliers are:

6 m 2 m 70 cm 23 cm 13 cm Higher
x1 x4 x7 x10 x13 x18

For each band, multiply the number of contacts by the number of locator squares worked on that band, then by the appropriate band multiplier. For example, on 2 metres, 20 contacts x 4 squares x 4 = 320 points. See the sample scoring table below.

Logs

For each contact: UTC time, band, station worked, serial numbers and locator numbers exchanged, points claimed

The front sheet should contain name, address and callsign, section entered, the period of operation to be scored (if entering the six hour section), and a scoring table.

The scoring table should be as follows:

Band	Contacts	Squares	Mult.	Total
6 m	xxxx	x xxxx	x 1 =	xxxx
2 m	xxxx	x xxxx	x 4 =	xxxx
70 cm	xxxx	x xxxx	x 7 =	xxxx
etc.				
Overall Total				xxxx

Entries

Post logs to the Manager, VHF-UHF Field Day, PO Box 2175, Caulfield Junction VIC 3161. Logs must be received by Monday, 30 January 1995. Early logs would be appreciated

Awards

The overall winner will be the highest all-band scorer in Section A. Awards will also be made to the highest scorer on each band in Section A, and the highest scorers in Sections B, C and D.

*PO Box 2175 Caulfield Junction, VIC 3161

Divisional Notes

VK2 NOTES

Richard Murnane VK2SKY

The VK2 Notes return (again!), hopefully for good this time. In late September, Roger Harrison VK2ZRH resigned from the VK2 Council making a number of claims of illegal activities on the part of several Councillors. Council accepted his resignation, but rejected his stated reasons for doing so. Tony Lullo VK2ZL fills the vacant position left on Council, and Pixie Chapple is now Divisional Secretary; several other Council portfolios have been reallocated.

Things are at last getting back on an even keel. The broadcast team (most of whom had resigned over the last year) have now returned, and the Divisional President, Michael Corbin VK2PFQ, gives an address to the members each week. What he says might not always be what you'd like to hear, but it is what needs to be said.

The damage caused to the Dural facility when it was "closed down" in January is still being repaired, but most services have been restored

The Divisional Voice Mailbox on 724-8793 seemed to fall into disuse shortly after the AGM. Hopefully, this service will soon carry the weekly news highlights from VK2WI once again

Evidence is currently being prepared for an approach to the courts to allow the Division to hold fresh elections. Meanwhile, the interim Council is attempting to conduct the business of the Division with the help of an increasing number of volunteers. A handful of habitual malcontents on packet appear to have plenty of spare time on their hands, perhaps they'd care to do something positive for the Division?

Spares Required for Dural

The Division is looking for type 807 valves for the AM broadcast transmitters at Dural. Our last request for 810's brought a good response — can we depend on you again? We're also looking to restore our broadcast service on 6 m SSB and we require a crystal locked transceiver for that band, with an output power of at least 10 watts. If you can provide the goods, please contact the Divisional Office.

Message from the President

As this will be the last opportunity before Christmas, on behalf of myself and the "Council", I wish members, readers and their families a happy and Holy

Christmas, and everything you wish for yourselves in the New Year

Michael Corbin VK2PFQ

VK3 Notes

Barry Wilton VK3XV

Christmas Holidays

The WIA Victoria office will close on 15 December 1994, and reopen on 7 February 1995. Membership applications received by post during this period will be processed.

80 Metre DX Window

A submission prepared by Peter VK3QI and David VK3EW has been tabled by WIA Victoria, and we are confident the SMA will soon grant an extension to the bandwidth of this important DX window.

EMC and Amateur Operators

WIA Victoria has been closely monitoring the development of cable television and the proposed methods of distribution. The recently stated intention of Optus to distribute via fibre optics, line amplifiers and co-ax cable suspended overhead on poles currently used for electricity supply is of concern.

There could be potential for interference on amateur frequencies, and also for amateur operators to interfere with domestic television, if this method of distribution is utilised.

When the matter was raised with the SMA, a less than satisfactory response was received, and the SMA advised any problems encountered would be the responsibility of the telecommunications watch-dog, Austel.

WIA Victoria is dissatisfied with this response and intends to vigorously pursue this matter.

Nominations for Council

Nominations for the 1994/95 Victorian Division Council close at noon on Friday, 13 January 1995. Nominations will only be accepted on forms available from the Secretary. Nomination forms must be obtained prior to close of business on Thursday, 15 December 1994. Nominations may be returned by ordinary mail to the office, and will be processed during the holiday period

Sunday Broadcast

During the year several members requested the broadcast be extended to the 20 m band to cater for mobile users

in interstate areas. Two surveys conducted produced very little in the way of support for the proposal.

Material for the broadcast continues to be in short supply and we are in need of a willing hand to produce scripts on a regular basis.

If there is not sufficient interest in the broadcast, and news gathering and production assistance is not forthcoming in the new year, Council will need to look to other options which include reducing the number of broadcasts put to air in any one month.

Special Projects Funding

This initiative was very successful with financial assistance being provided for a number of projects which are now nearing completion. The majority of applications received for assistance involved extension to the packet network and linking of services.

We hope to be able to continue this assistance for projects of benefit to members in the new year, and submissions will be welcomed from other special interest groups.

Members will be advised both in *Amateur Radio* and on the Divisional broadcasts when requests should be made.

The Council Extends Seasons Greetings to All Members.

VK6 Notes

Peter Parker VK6BWI

At its Annual General Meeting on 5 October at Wireless Hill, the WA Amateur Digital Communications Association elected the following.

President	Phil VK6AD
Vice President	Ian VK6ZGA
Secretary	Rob VK6ABR
Technical Officer	Joe VK6ZTN
Broadcast Officer	Clem VK6CW
Auditor	Frank VK6JK
Committee	Rob VK6VP
	Ray VK6RR
	John VK6NT
	Trish VK6QL

Wireless Hill is an excellent VHF site, providing good coverage around the Perth Metropolitan area. The Association's PBBS is located here and has a user port on 144.725 MHz. RTTY users on 146.600 MHz can be linked through to the packet network by this system. The PBBS also transmits on 14.109 MHz to link us with the outside world. 147.575 MHz is used for forwarding between BBS systems.

It is understood that a digipeater at Cataby between Perth and Geraldton, is proposed. To play your part in ensuring that this and other exciting projects come to fruition, you are welcome to attend the

Association's monthly meetings. They are on the first Wednesday of every month (except January) at the Wireless Hill Meeting Room, starting at 8 pm.

Special Divisional Meeting Attracts Potential Amateurs

For many years, amateur radio study courses in Perth had been run through the TAFE system. These were dropped about two years ago. The Division has realised that, in this age of user pays and devotion, we must take our own initiatives to train and examine the amateurs of tomorrow. Accordingly, we held a special meeting on 3 October to ascertain interest for a proposed amateur radio course. Thanks to word-of-mouth and advertising in local newspapers, enough people attended to warrant a course being started. It will have begun by the time you read this, the first class being held on Tuesday, 8 November.

The class is being conducted every Tuesday night for approximately two hours over a twenty week period. It's being held in Bullcreek and the instructor is Allan Bell VK6SK. For further information on this and future courses, contact the WIA Divisional Education Coordinator, Rob VK6THB, on (09) 434 3283.

The VK6 Division wishes its members a safe and prosperous 1995.

"QRM" — News from the Tasmanian Division

Robin L Harwood VK7RH

Sadly I have to report that two more VK7 hams have died recently. Rick Bray VK7ZZ passed away on 26 October after a long illness. He came from England and worked at the Australian Maritime College for nine years. He was active in several community groups, including the Northern Caveengineering Group, and served as secretary of the Northern Branch of the WIA in the mid-eighties. He was also a driving force behind the AMC Amateur Radio Club. Rick checked in occasionally during the past year on the daily Tasmanian Sewing Circle Net on 3590 kHz.

Harry Bracken VK7BR was another amateur who was active in the North in the mid-sixties. He worked in the PMG's Department at various locations within the State.

As we come to the end of the calendar year, it seems to have become traditional for each Branch to wind up with either a BBQ or a Christmas Dinner. At deadline time only the Northern Branch has yet to finalise their plans, but these should be

announced on the weekly VK7NB broadcast on Wednesdays at 1930 hours locally on repeater 7000 and 3590 kHz.

The Southern Branch, also now known as VK7OTC, will be holding a Christmas BYO BBQ at the Domain Activity Centre on Sunday, 4 December from 11.00 am. The Northwestern Branch will be holding a Christmas Dinner at the Bass & Flinders Motel in Ulverstone on 13 December. This will be in lieu of the normal monthly meeting. For further details contact David Spicer VK7ZDJ.

The only scheduled monthly meeting will be the Southern Branch at the Domain Activity Centre on 7 December at 2000 hours. January is the quietest month with neither Northern nor Southern Branches meeting. However, the Divisional broadcast will be continuing throughout January although VK7NB will be in recess till the end of January.

In conclusion, may I, on behalf of the Tasmanian Division, extend Season's Greetings to all members of the Division and look forward to your active participation in 1995 which, coincidentally, is the Centenary of the Development of Wireless by Guglielmo Marconi.

ar

For All Your Requirements

AUTHORISED DEALER FOR:

KENWOOD

ICOM

**Amateur ■ Commercial
Marine Communications**



Shop 3, 443 Albany Highway,
Victoria Park, WA 6100.
Telephone (09) 470 1118
Facsimile (09) 472 3795

How's DX

Stephen Pall VK2PS*

The other night I had a very bad dream. I woke up in a sweat. I dreamed that the US Treasury had decided to withdraw the \$US1.00 note from circulation. Can you imagine, if that ever became a reality, what would happen to the direct QSLing system? The well known "green stamp" no more! Disaster!

Not necessarily so. One opinion is that most of the award programs, which require a physical QSL card for proof of contact, will be forced to change their rules. Another opinion says that it will be not a problem, the bureau system will be used. At present most of the serious DXers do not use the bureau system because of its predictable weaknesses — slow, often very slow (one to three years, or more, turn around of cards); and the unpredictability, especially in the developing countries, of the existence or non-existence of QSL bureaus.

As a last resort, if there are no more green stamps, we will have to use IRCs, the International Reply Coupon system. This would seem to be the logical conclusion. There are some problems with IRCs also. Postal authorities in some countries, for example Germany, have a fixed monetary value placed on them. The German postal system values one IRC at DM 2.00 whilst the air-mail postage from Germany to a foreign country outside Europe, say Australia, is DM 3.00, so you need to send two IRCs to the German QSL Manager. Postal rates, the purchase price of IRCs, and the monetary foreign exchange system are interlinked. A year ago, and I am talking now about the Australian situation, one IRC cost a little over one Australian dollar (actually, \$A 1.35). If you bought some IRCs lately you found that you had to pay \$AUS2.00 for each of them. A hefty price increase and it was not publicised widely. On the other hand the purchase price of one IRC in Japan is 150 Yen which equates really with \$AUS 2.00.

What I am saying is this, and I am sticking my neck out for predicting the future, be prepared for a considerable increase in the near future of Australian Postal rates to foreign countries. Do not be misled by the multi-colour four page pamphlet released recently by Australia Post entitled "Five year price freeze". That refers only to a domestic standard letter rate of 45c which will be frozen, at least until the beginning of 1997. The difference between 1997 and 1994, if my maths are correct, is only three years. Maybe

Australia Post uses a different mathematical system.

To make this polemic short my advice is to do all your direct QSLing now, before the end of the year, at a cheaper postal rate. Talking about the end of the year? Yes, the 12 months of 1994 are nearly over. I wish all my readers a joyous season, a healthy, prosperous and peaceful New Year, and good propagation on all bands.

What is a DX Country?

With the present controversy surrounding the Pratas Island operation, the Scarborough Reef activity, the non-acceptance of the P5RS7 operation for DXCC credit, and the recent deliberations about the minimum size of a country, I feel it is time to summarise for readers the present rules of the DXCC regarding the definition of a "country".

When an area in question meets at least one of the following three points, it is eligible as a separate country listing for the DXCC countries list.

Point 1 Government

Independent country or nation-state having sovereignty. Points to consider include: Body of society united together politically with definite territory, definite population, organised or controlled under one exclusive regime and engaging in foreign relations, has the capacity for international agreements, diplomatic relations, possible membership in United Nations, membership in the International Telecommunication Union, authorised user of ITU allocated call sign prefixes, issues currency, stamps, regulates foreign trade, etc.

Point 2 Separation by Water

An island or a group of islands which is part of a DXCC country established by reason of Government, is considered as a separate DXCC country, if:

- The island, or the island group, are situated offshore, geographically separated by a minimum 225 miles of open water from a continent, or island or island group that makes up any part of the "parent" DXCC country; and
- A "second" island of the same DXCC country must have a separation by water of at least 500 miles from the first island and a separation of 225 miles from the "parent country".

Point 3 Separation by Another DXCC Country

- Where a Point 1 DXCC country (government) composed of one or more continental land areas or of continental land areas and islands, is totally separated by an intervening DXCC country into two land areas which are at least 75 miles apart, two DXCC countries are created.
- Where a Point 1 DXCC country (Government) composed entirely of islands is totally separated by an intervening DXCC country into two areas, then two DXCC countries result. No minimal distances required by separation.

Point 4 Ineligible Areas

- Any area which is unclaimed or not owned by any recognised government.
- Any demilitarised zone, neutral zone, buffer zone.
- The following do not count as a separate DXCC country from the host country: embassies, consulates, extra-territorial legal entities of any nature including, but not limited to, monuments, offices of the United Nations Agencies or related organisations, other intergovernmental organisations or diplomatic Missions. Of course, the above is a précis of the rules and regulations of the DXCC award. If you want the total information about the Award, send \$US2.00 for a handsome 30 page booklet entitled "The ARRL DXCC Countries List" containing an application form for the award to: The ARRL, 225 Main St, Newington, CT 06111 USA. Your booklet will arrive by sea-mail.

Bhutan AS

It was late in October on a Thursday night at a Japanese restaurant in Sydney's Crow's Nest area. A small group of amateurs raised their glasses to the expected success of an upcoming possible DXpedition to Bhutan. Jim VK9NS was full of enthusiasm. Atsu VK2BEX, a well known DXpeditioner in his own right, and myself, not yet a DXpeditioner but a recorder of this column, were the listeners.

Jim recalled the many years of negotiations and preparations prior to his first visit to that country, between 21 March and 11 April 1990, when he made approximately 15,000 QSOs. Jim went back to Bhutan a year later with Kirsti VK9NL. He hoped to operate again but did not succeed in obtaining permission to operate. However, he has maintained close contact with the Bhutanese officials since 1991. Finally there was some result. In October 1994 he was invited to Bhutan by the Bhutanese Ministry of

Communication for a visit in connection with the Amateur Radio Service. Jim passed through Sydney on his way to the Kingdom of Bhutan on 27 October. He intended to stay in Bhutan, and possibly also in Bangladesh, until the end of November. An old friend and DXer, Kan JA1BK, will accompany him on his Bhutan adventure.

For those who are not familiar with the geography of Bhutan here are a few basic facts about the country. It is situated in the south eastern part of Asia, immediately south of the Himalayas. China, India and Nepal are the neighbouring countries. It is a small mountainous country of about 47,000 square km in area with a population of approximately 1.5 million. The capital of the country is Thimpu with about 12,000 residents. The Kingdom of Bhutan has been governed by a dynasty of hereditary kings since 1907.

Bhutan was more or less a closed country and has opened up to outside western influence only since World War II. Road improvements have opened up many parts of the country and airlines have been established with neighbouring countries. Despite modernisation the Bhutanese try to retain their unique religious and cultural heritage. The future of amateur radio lies entirely with the Bhutanese. Pradhan AS1PN was the last Bhutanese who operated amateur radio from that country in the early 1980s. Jim's visits in 1990 and 1991, and his present visit, hopefully will assist in establishing the amateur radio service for the Bhutanese and for the rest of the amateur radio fraternity.

Decision of the DXCC Awards Committee

The DXAC, the DX Advisory Committee, made some recommendations as reported in a press-release on 24 August (See November *Amateur Radio*) about the minimum size for a new DXCC country.

The DXCC Awards Committee has voted five to two against the DXAC's recommendation as per a news release issued on 8 October. Those voting against shared the feeling that a minimum size rule was not needed.

Awards committee chairman, Chuck Hutchinson K8CH, advised the result with DXAC chairman, Bob Beatty W4VQ, immediately after the vote. Standard operating procedure for the committee allows the DXAC to resubmit a recommendation (with or without changes) on appeal, and Chairman Beatty has announced his intention to do that. Individuals may send comments to ARRL HQ. Comments addressed to the DXAC will be read by members of both committees.

DXAC Chairman Beatty has declared



Jean Michel TR8JH, Gabon, with a child from the local village.

a moratorium on new DXCC country petitions that may be affected by a minimum size rule. This moratorium will continue until such time as the deliberation on this issue is complete.

Future DX Activity

- Dave A22MN is very active on all bands. He will stay there until March 1995. QSL via WA8JOC.
- HS0/DL2VK is Reiner who is active from the Northeast of Thailand — Nakhom Phanom — for 6 months starting 10 October. He prefers CW but works also in SSB and digital modes.
- There is a rumour, originating from Germany, that a group of ZLs intend to activate the Balleny Island group (Antarctica) from Sabrina Island in December 1994. Sabrina Island is located on the West side of the island group. On the island there are the ruins of a polar station built in 1948 but abandoned some years later.
- FR5HG/E is active on Europa Island, length of stay not known. Europa is a small rocky and sandy island located at 22° 20' S and 40° 21' E off Madagascar.
- Walt G4NYY, Tim G4VXE, and Dave WG3I will be active from Nassau, New Providence island from 10 to 18 December on 160 to 10 m, including the WARC Bands. Operation will be mainly in CW. Callsigns will be C6A/home call. QSL via home call.
- TJ1JR is active. Randy is a missionary who arrived in Cameroon with his family in July and will be there for the next four years. QSL via N7VEW.
- VK0IX will be active from Casey base, Antarctica. QSL via VK5PO.

- HH1D and HH1T are Darlene KC8CTC and her husband Tim KB8CTD. They are missionaries in the mountain area of Haiti. QSL via NE8Z.
- Jeff VP9NC is active mostly on CW. QSL to WB2YQH.
- Peter XT2BW has returned to Burkina Faso and expects to be active until the end of 1994. QSL to WB2YQH.
- There was some news back in June 1994 that Joe DF1AL was planning a DXpedition to Congo, TN, from 27 February to 8 April 1995. No further news has come to hand since.
- A92FV is on the bands. His length of stay is unknown. The operator is G0CAB and he is active on the CW bands.
- The following Canadian special prefixes may be used to commemorate the International Year of the Family from 29 October to 29 December VB, VG, X09, X00, XN9, XN0.
- Joe FK8GY will be active from Lifou Island in the Royalty Group (OC-33), between 10 and 12 January 1995 on 20, 40 and 80 metres. Those who work him will receive a Diploma from the REF, the French national amateur body. QSL to Box 7219 Noumea, New Caledonia.

Interesting QSOs and QSL Information

E = East Coast W = West Coast M = the rest of Australia.

- VR2KF — Kazu — 14226 — SSB — 1200 — Oct (E). QSL to Kazu, GPO Box 4724, Hong Kong.
- 9Y4NG — Arnold — 14225 — SSB — 1303 — Sep (E). QSL to A Griffith, 646

Ocean Ave, Gulf View, Laromain, Trinidad.

- 6T5JC — Enc — 7083 — SSB — 0654 — Sept (E). QSL to F6FNU, Antoine Baldeck, BP 14, F-91291, Arpajon Cedex, France.
- HC5EA — Edgar — 14191 — SSB — 0506 — Oct (E). QSL to The Manager, PO Box 14, Cuenca, Ecuador.
- HS0DL2VK — Reiner — 14020 — CW — 1121 — Oct (W). QSL to DL2VK, Reiner Eischens, Diezer Str, 95, D-65549, Limburg, Germany.
- YN5JAR — Jose — 7083 — SSB — 0642 — Oct (E). QSL to Jose Antonio Roman Matus, PO Box 122, Jinotepe, Nicaragua.
- 8J1RL — Masa — 14018 — CW — 0953 — Sep (W). QSL to Japanese QSL Bureau.
- 9J2GO — George — 14164 — SSB — 0527 — Sep (W). QSL to George, 56 Datura Ave, Luanshya, Zambia, Africa.
- VU2LX — Laxman — 14015 — CW — 0218 — Sep (W). QSL to K Lakshmannan, 30/3 Nanjappa Rd, Shanthi Nagar, Bangalore, 560027, India.
- 4L4TL — Tom — 14190 — SSB — 0537 — Oct (E). QSL to TA7KA, Mr Omar, PO Box 71, TR-61000, Trabzon, Turkey.
- JW8GV — Ala — 7084 — SSB — 1108 — Oct (E). QSL to The Manager, PO Box 27, Longyearbyen, N-9170 Norway.
- 9V1XQ — Mike — 7083 — SSB — 1001 — Oct (E). QSL to G4PKP, John Jones, 24 Matthew St, Liverpool, Merseyside, England, L2 6RE.

From Here, There and Everywhere

- Hartmut 9X5HG was reported on SSB on 20 m early in October. Apparently he went back to Rwanda to salvage whatever was possible from the ruins of his house. He indicated to his QSO partner, SV1CRY, that "my time in Africa is over". He closed down on 21 October and returned to Germany.
- Contacts with XY1HT, the demonstration station activated by Japanese amateurs for the Manmar authorities, has been approved for DXCC credit. There were a number of contacts with seven neighbouring countries using SSB and SSTV.
- If you have worked Jon VP8CQJ on the Falkland Islands, send your QSL with reply envelope and IRC to Jon Capp, 9 Hawthorn Rd, Gatley, SK8 4LX, UK.
- Cliff 5W1GC, who is well known to the VK/ZL DXing fraternity, returned to the US on 31 October. His new QSL address is Cliff Luxion KE5GC, PO Box 1808, Aurora, IL 60507, USA.
- If you worked XF4M on Revillagigedos, send your card to AA6BB.

- Those who are operating in the 75 m "DX window" must have heard a very strong RTTY signal on 3796.5 kHz, causing severe QRM. This signal appeared intermittently early in October. According to the FCC the signal is coming from the Caribbean, probably from Haiti, and it could be of US military origin.
- 9N1SC was the call of a Mount Everest DXpedition activated by G4SSC.
- The QSL address of FG5BG is Georges Santalican, 44 Rue Amedee Fengerol Brest, F-97130, Capesterre, Guadeloupe, FWI France
- Is this a trend for the future of amateur radio? The IOTA Committee of the RSGB and Yaesu UK Ltd, announced that they have entered into a sponsorship agreement by which Yaesu becomes the principal sponsor of the RSGB IOTA Program. The agreement is a worldwide agreement and runs for three years from 1 October 1994.
- Did you know this? The DXCC Award came into being as a result of an article in October 1935 "QST" entitled "How to count countries worked; a new DX scoring system" by Clinton B De Soto W1CBD. He described the first country criteria as "The basic rule is simple and direct; each discrete geographical or political entity is considered to be a country."
- Art NN7A sent me a note about his proposed activity in Victoria, South Australia and Northern Territory during the month of November. Unfortunately, his letter arrived after the deadline for the November issue of *Amateur Radio*. Art operated as VK3FBM and his wife Dede as VK3JKQ from various places including Phillip Island (OC-136) and Kangaroo Island (OC-139). Please QSL direct to Art Phillips, PO Box 201, Flagstaff, Az 86002 USA or via the W7 QSL Bureau.

- ZL6DJ was a special event station celebrating the Diamond Jubilee of the NZART.
- If you worked 3D2BE, QSL to H89KAS.
- A contact with ED5DX can be confirmed via EA5BYP.
- TI2JJP was active from Cocos Island (Pacific Ocean) from 20 to 29 October as TI9JJP.
- Kan JA1BK is returning the donations that were made for the P5R57 DXpedition, which was not accepted for DXCC credit.
- Did you know that before you are allowed to operate on SSB as a resident of Bermuda (VP9), you must first have 500 CW contacts?
- VK9RNI is a new 6 metre beacon being installed on Norfolk Island.
- If you come across a ZL1BAI call sign, he is none other than Jim VK9NS.
- The correct QSL manager for the contest station HG73DX is HA1KSA. This includes past, present and future activity. Direct or via the Bureau.

QSLs Received

H44MS (3W DL2GAC) — YJ0AVH (2M VK4CRR) — TK5BF (2W op) — HP8ADU (5W op) — F5NBX (2W op) — S59AA (2M op) — V44KAI (3M op) — YS1DRF (6W W2PD) — C41A (5W 9A2AJ) — VP2EJ (4W N6ZJM).

Thank You

Many thanks to those who have contributed to this column, but especially to VK1FF, VK2KCP, VK2KFU, VK4AAR, VK6DX and VK9NS. Special thanks also to the following sources of information, *QRZ DX*, *The DX Bulletin*, *DX News Sheet*, *The W6GQ/K6HHD QSL Managers List*, *INDEXA*.

*PO Box 93, Dural, NSW 2158

BY



Jim TU4EI, Ivory Coast, with pet spider monkey "Bobo".

FTAC Notes

John Martin VK3KWA, Chairman, Federal Technical Advisory Committee.

2.4 GHz Band Plan

This further revised plan takes into account all comments received on the earlier drafts, and it is proposed to present it to the WIA Federal Council for formal adoption early next year. The plan allows both terrestrial and satellite operation with a single transverter crystal. Other main features include two wideband channels, each 18 MHz wide, for FM ATV, and separate FM simplex segments for voice and data.

A fully detailed copy of this plan has been circulated to all states and copies are also available on request via the WIA Federal Office.

- 2400-2403 SATELLITES
2403-2406 NARROW BAND MODES (Note 1)
2406-2424 WIDEBAND MODES (Note 2)
2424-2425 NARROW BAND MODES (Note 3)
2425-2426 FM SIMPLEX (VOICE)
2426-2428 FM SIMPLEX (DATA)
2428-2430 FM DUPLEX (Note 4)
2430-2448 WIDEBAND MODES (Note 2)
2448-2450 FM DUPLEX (Note 4)

Notes

1. The 2403-2404 MHz segment subdivided as per existing plan for 2304 MHz, ie DX calling frequency 2403.1 MHz inband linear translators possible using 2404/2424 MHz, and crossband on 2405 MHz.
2. FM ATV frequencies 2415 +/- 9 MHz and 2439 +/- 9 MHz. Recommended primary channel for FM ATV: 2430-2448 MHz. The 2406-2424 MHz channel to be available until/unless required by future satellites.
3. Reserved for possible use for Region III NB and linear translators.
4. These segments intended primarily for links but could also be used for experimental repeaters.

1.2 GHz Band Plan

The new plan for this band is still under discussion but a decision will be needed soon. A number of comments have been received from repeater groups, ATV groups and others, and there is general agreement on changing over to the international standard 20 MHz repeater split after the remaining 1275 MHz radars close down.

There were some objections to the band plan proposal circulated in July, especially over the bandwidth and placement of the ATV channel, and the need for a wideband data segment. A further revised proposal is shown below

which I believe overcomes the problems in the earlier plan.

The main changes are an 18 MHz wide ATV channel at 1274-1292 MHz, and new FM simplex segments for voice at 1294 MHz and data at 1297 MHz. A fully detailed copy of this plan can be obtained on request via the WIA federal office.

This proposal has already been circulated to all WIA Divisions, and comments would be appreciated as soon as possible. I am hopeful that agreement can be reached in time for the plan to be finalised and approved at the same time as the 13 cm plan early next year.

- 1240-1270 No change from current band plan
1270-1272 NARROW BAND MODES (Note 1)
1272-1273 LINKS
1273-1274 REPEATER OUTPUTS
1274-1292 ATV CHANNEL 2 (Note 2)
1274-1281 AM ATV
1283 +/- 9 MHz FM ATV
1285-1292 AM ATV
1292-1293 LINKS
1293-1294 REPEATER INPUTS
1294-1295 FM SIMPLEX (VOICE) (Note 3)
1295-1297 NARROW BAND MODES (Note 1)
1297-1300 FM SIMPLEX (DATA) (Note 4)

Notes

1. These segments subdivided as per existing plan for 1296 MHz
2. Recommended use for simplex or repeater outputs.
3. Channel spacing 25 kHz, calling frequency 1294.5 MHz.
4. Intended primarily for high speed data with 100 kHz channel spacing. Further details to be discussed with packet radio groups.

Packet Radio Band Plan Proposal

The South Australian Division has proposed an increase in the number of packet radio channels on both 2 metres and 70 cm, and the allocation of several 70 cm repeater pairs for use by regenerative repeaters. This proposal has been circulated to all Divisions together with an alternative proposal from FTAC. Full details of all of these proposals will be published next month.

National Foxhunting Channels

It has been suggested that there is a need for national foxhunting channels on VHF bands. I do not have much information on foxhunting activity, except that the mode used is usually FM and that different states use different frequencies. A national foxhunting frequency would simplify matters for national competitions and reduce the possibility of QRM. For that reason it would be a good idea to pick channels in the less used parts of each band.

I would appreciate any comments and suggestions on this. To start the ball rolling, I would suggest the following channels: 53.300, 145.300, 433.850.

On 23 cm, the frequency depends on proposed changes to the band plan. If the new 23 cm band plan shown above is adopted, I would suggest 1294.850 MHz for the foxhunting channel.

80 m DX Window

Mr Peter Allen, Acting Manager, Technical Services Team of the SMA has written confirming that the Regulations relating to the 80 m DX window are as described in last month's notes.

He stated that the carrier frequency for LSB stations in this window should be limited to 3.798 to 3.800 kHz.

He also stated it is most important that services operating immediately below the 80 m DX window do not receive interference from out-of-band amateur transmissions.

PO Box 2175, Caulfield Junction, VIC 3161

af

WIA News

New Federal Secretary

Mr Lewis Badge has been appointed the new WIA Federal Secretary. His appointment was made by the WIA Federal Executive at the quarterly extraordinary convention over the weekend of 29-30th October. He took up his appointment in early November. Mr Badge is an accountant by profession and has a commercial background as a company secretary.

Donna Reilly, who served as Federal Secretary following Bruce Thorne's resignation in August, has returned to her previous role as Office Manager.

International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch

Gordon Loveday VK4KAL*

Live Intruder Watching Nets

This material was taken "off air" by VK4BRG and passed to VK4KAL.

Are you concerned about the future of our exclusive frequencies, their orderly use by amateurs and the growing number of pirates, intruders and QRM on our bands? If so, please read on. I make the following suggestions:-

1. Only we ourselves will take full care of our hobby. We must speak for ourselves and protect our own interests.
2. The Intruder Watch organisations and monitoring system are doing just that, but do not receive enough support. If all of us just devoted a few hours operating time, even once a month, to logging intruders and reporting them to the co-ordinators, it could make a really big difference.
3. About 75% of the reports received by the intruder watch services appear to lack the vitally needed information necessary to "busting an intruder": eg QTH(country), or identity of the intruder. This information is usually missing for the following reasons:-
(a) Intruders do not usually give this information in their transmissions;
(b) Reports by only one or two amateurs are usually of short duration, thus insufficient information could be gathered, except time, date, frequency; and
(c) The intruders do not always follow regular schedules and may re-appear on other frequencies in our bands on other days.

I think this situation can be radically improved with live on-air reporting through a Worldwide Intruder Watch Network, which would operate by collecting on air reports (often live) and pooling the resources of radio amateurs checking into the network, eg by rotating beams from different countries, a good idea of the approximate location of an intruder can be determined and, with co-operation of net amateurs in the country concerned, the location narrowed down even further. A report then can contain the vital information leading to effective results — intruders generally do not like to be famous!

These efforts need co-ordinating in an efficient and organised manner, with net frequencies, co-ordinators, net control stations and region networks. Such a

network can assist all intruder watch monitoring systems in a more effective way than relying on the slow process of the postal system and the few dedicated amateurs sending in regular reports by mail. It is also much more fun to have a live net where fellow "intruder busters" can meet and share information and expertise, using RDF techniques, language skills and knowledge of propagation, unusual modes, as well as taking advantage of our wide geographical dispersal. A monthly bulletin could still be compiled and sent to subscribers listing monitored intruders.

If you are interested in joining this effort, either as a casual reporter, checking into the net, as a control station, or co-ordinator, or a regular monitor, please contact ST2AA @ I5FLN.ITA.EU or call ST2AA on 14.068, giving: Call and Name; ngs/antennas; modes used; ways in which you can help; postal address; and/or BBS.

73 de Lou ST2AA.

It would seem that we in VK have a very good general set up, but these notes should be read with the desire to increase our number of observers in ALL STATES. The coming months are going to allow a greater number of intrusions to be heard. DON'T COMPLAIN to your pal overseas, SEND me your complaint, Freepost

Frequency	Date	UTC	EMN	Details
3.578.3	23/02/94	0935	A3E	non AM B/C
3.6200	10/02/94	1200	A3J	B/C Indonesia, music
7.0000	12/02/94	1140	J3E/U	Indonesia TFC, Lima Kali etc
7.0050	07/11/93	1045	J3E/U	CB interference
7.0100	31/01/94	1210	J3E/U	3 way, Timor/Jakarta/Padang
7.0150	12/02/94	1140	J3E/U	2 way, m ops Jakarta
7.0500	03/03/94	1650	A3E	B/c stn, M F voices, Timor
14.030	22/02/94	1210	A3E	Indonesian lang, music

Number 4, and get him/her to lodge a similar complaint in their country. It is your fault if you DO NOT ACT, NOW

Some Notes on Intrusions from Indonesia

From IARUMS notes of September 1994, an Indonesian broadcast station comes on air on 7098.7 MHz before 1000 UTC, no set time, often 0945 UTC at S 4 (on scale of 1 — 5). Some distortion program is speech and "hit parade". Bearing from Brisbane of 305 to 310 degrees, ID as Island of Java.

Note that in 1988/89, 7098 MHz was assigned to Yogyakarta, Indonesia with low power of 10 kW, logs of those years gave reports of S3. The listing was 7.098 variable by 0.5 kHz. No ITU listing above this in 1994.

Most interference seems to be in the lower frequency bands at present.

PA7 is a 21 MHz intruder. Tfc is "Ministry of Foreign Affairs".

The frequencies are 21.110, 21.114 or 21.220 MHz. Also to be found on this latter frequency is BR6, active with Tfc often at 0400 and 0600, but has moved frequency to either 21.114 or 21.110. I suspect this was due to amateur pressure. More amateurs should pile up on this frequency and squeeze BR6 off the air.

Moscow Naval Radio has claimed 14.171 MHz, ditto RIW on 21.255.5 MHz and UMS again on 21.284.1 MHz. French Military on 21.384.6 MHz (with ARQ mode). VRQ Hanoi and MNR UUMS on 21.031.5 MHz. What are they playing at? These frequencies have been strenuously defended for as long as they have been infringed (I can go back about 28 years).

*Federal Intruder Watch Co-Ordinator. Freepost No 4
Rubyvale QLD 4702 or VK4KAL@VK4UN-1

**When you buy something from
one of our advertisers, tell them
you read about it in the
WIA Amateur Radio Magazine.**

Education Notes

Brenda M Edmonds VK3KT* Federal Education Coordinator

In September I had the pleasure of attending the IARU Region 3 Conference in Singapore. I had not thought of attending until it was pointed out that there were a number of items on the agenda in which I would be very interested or to which I could contribute. A full report from Kevin Olds, the WIA delegate, has already been published, but I would like to elaborate on some of my special interests.

A major item was the proposal for international recognition of amateur licences to reduce the formalities required when amateurs wish to visit another country, or to change address permanently.

In Region 1 this is being done by way of the CEPT licence agreement. Countries which are signatories to this agreement accept the licences of all other such countries, so that reciprocal licences are not needed for visits. In addition, the European countries are investigating the possibilities of a "Harmonised" licence,

ie a licence syllabus which is mutually agreed so that licences issued by all countries are of equal standard.

In Region 2 the same result is achieved by an International Permit, similar to an international driving licence, which is accepted by all the countries which have joined the scheme.

The Conference agreed that Region 3 countries should seek international recognition for their licences, but gave no directions for further action. In Australia, the SMA is presently working towards the acceptance of our licences for CEPT accreditation. New Zealand has already been accepted into the scheme. It seems to me that there is room for both approaches, ie the agreement with the European countries and the development of the "harmonised licence" in the Pacific area. From what I have seen, the examination syllabuses in some neighbouring countries are very similar to ours although, of course, the depth may vary and I have not seen many overseas examination papers.

A lot of Conference time was spent discussing ways in which amateur radio could be encouraged in countries where amateurs are not presently active. In some there is actual prohibition of such activities, but in others there are perhaps a couple of amateurs who need help to gain recognition from their governments and to enable training and encouragement of new recruits. I will discuss some of the suggested strategies in a later column.

In addition, of course, the interchange and discussions which took place outside the Conference sessions were of great value. I found it very rewarding to meet with representatives of the RSGB and other societies and to hear how their examinations are structured, or the problems which beset them. Some problems seem to be common to many societies. We are very lucky in the good relationship which exists between the WIA and the SMA.

My main regret from the trip was that there was not enough time to talk to more of the delegates and observers. There was obviously a lot of information available which I could not collect in the time.

*PO Box 445, Blackburn VIC 3130

AR

An Old Timer Reflects....

Des Greenham VK3CO (SK) continues to look back over 50 years of amateur radio operation.

Is HF radio communication irrelevant today?

I wonder, after a recent experience. Our Rotary club was hosting a group from Brazil and one night one of the team asked me if I could take her to a "card" phone. I took her to the phone and I sat in the car waiting. She returned to the car in about seven minutes and told me she had called Brazil and ascertained a phone number in Japan, then called Japan and arranged her plans for a visit. All this in seven minutes and at a moderate cost!

This demonstrates modern technology and, in comparison to a Ham station calling CQ, makes us look quite primitive. This episode caused me to recall an experience in 1950 when communication overseas by phone was very limited and not readily available to the public. One day, on 15 metres, I heard a station in Hawaii calling "CQ Melbourne". As I was living in Melbourne at that time I answered the caller. I was asked if I knew a place called "Springvale" and answered in the affirmative. He told me the story.

His commanding officer at the US Navy base on Oahu Island had arranged for his Australian wife and daughter to visit her parents who lived in Springvale. It was thought she had arrived but no message had been received from her and he was concerned for their safety. After receiving the address, my wife and I set off late at night to find the missing lady. We finally found the house in a remote part of Springvale and I will never forget the surprise on the lady's face when I announced that I had been speaking to her husband in Hawaii!

We arranged for Joan and her daughter to visit our home and speak with her husband. This went well and we had a regular "sked" each Sunday afternoon for the entire time of her visit here. This was 40 years ago and we kept in touch for many years until Joan's unfortunate death some 2 years ago.

This was amateur radio in those days, and is only one of numerous stories where amateur radio provided a special service for people.

AR



The ideal Xmas gift

SEEK
YOU

American Radio Songs

A new CD of country songs about
HAM RADIO, recorded in Nashville
by THE HAM BAND

Every HAM, XYL, OM, and SWL will love these great songs
from *Heart of the Home*.

- Always on the Air.
- I'm not climbing up the tower no more.
- Its great to QSO in Morse again.
- The trip to Dayton.
- The Radio Widow.
- Seventy Threes.
- ... and 8 other Songs.

This unique CD costs only \$30.00 inc P&P
Cassette Tape \$20.00 inc P&P

To order just call TELRUM AERIALS ph (08) 3545444
or write to: fax (08) 3545455

5 Yampil Way, Willetton, Western Australia. 6155

Cheque - Mastercard - VisaCard - BankCard

Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

JOTA Went Well

Well, JOTA is over for another year. I would like to thank various people in this year's event, where I assisted. I am a recent amateur of only 12 months, and it was my first go at JOTA. The first time for everything is always different from what one expects.

Contrary to what I had heard about the organisation between the Scouts/Guides and amateur radio operators, I compliment the Tea Tree Gully Baden Powell Scout Group for the orderly conduct of the various groups of Scouts and Guides that were present over this JOTA weekend. Not only this but for the help given to me during the times I was "in the chair". My thanks go to Diane, Ivan (Skip), Bob, and to those behind the scenes. Special thanks to Trevor VK5ATQ for supplying, and allowing me to operate, his equipment. It's a pity not more amateurs assist in this event.

Hopefully I will be back next year with a full call sign and will try a little harder to bring in those elusive DX stations to JOTA.

John P Malusa VK5ZJP
7 Pope Crescent
Horse Valley SA 5090

Wrong "Facts"

I refer to *Amateur Radio*, September 1994 and the letter sent in by Jack van Schaik VK3AAC. Regarding this letter, my thoughts are these: Don't be sarcastic unless you know all your facts are correct.

VK3AAC should have known that in 1957 VK2ZAB could not have gained access to any HF band by passing CW at 5 wpm as no such exam existed then. Furthermore, VK2ZAB would not have had any further luck by passing a 10 wpm exam as the required CW speed at that time was 14 wpm. Not only this, but after three months from sitting the theory exam the entire test theory and CW may have had to be taken. This latter point could be open to doubt but the first two points have been documented.

Victor Barker VK2BTV
41 Skyline Street
Gorokan NSW 2263

High School Help

Richard Jenkins VK1RJ, in the Federal QSP in the August issue of *Amateur Radio*, emphasised the need to help schools develop radio interests. Jim Beattie VK4WJB followed this up in *Over to You* in the October issue.

Since retiring to Leeton, NSW nearly three years ago, I have been endeavouring to assist with the formation of an Electronics Section in the Leeton High School. The young people there have responded in a very positive manner and several have expressed an interest in amateur radio.

With a vision of perhaps forming a Leeton Amateur Radio Group I have tried to encourage these young people but with a degree of difficulty in expanding that interest. Any ideas both practical and theoretical, or offers to sell material suitable to encourage further developments, would be highly appreciated.

Packet World

Grant Willis VK5ZWI*

Setting TNC Audio Levels

Your packet station will work most efficiently if your audio transmit and receive levels are set correctly. The best performance is found with an audio deviation of your FM signal of around 3 kHz. It is unfortunate that a large proportion of packet stations run well in excess of this figure! In the case of packet, LOUDER IS NOT ALWAYS BETTER. A similar case also occurs with the receive audio from your radio speaker output to your TNC. Many people either set their receive audio level too low or too high. If it is too low, you will miss packets because the modem could not resolve them properly, and if it is too high you will miss packets due to the audio distorting in the modem.

In setting both transmit and receive audio levels in the absence of any test equipment, always set both controls to a minimum and then increase your receive level until you are copying packets on an active channel and then, while trying to connect, slowly increase your transmit audio level. Once you have connected, stop adjusting your levels as you are now in the ball park.

Another problem with packet tones that you transmit and receive may be that the relative levels between the 1200 Hz and 2200 Hz tones are not the same. (You will only notice this on a CRO, although it can have a marked effect on your receive error

I am not a teacher, being there only to assist, and depend on the good will of the staff. My own personal equipment was unfortunately relinquished when leaving New Zealand for Leeton.

Patrick H Adams VK2GRQ
(formerly ZL3AAR)
1/37 Palm Avenue Leeton NSW 2705

Northcote High School Re-unions

I would be pleased to hear from any VK members who were students at Northcote and District High School, Melbourne, between 1940 and 1950.

Northcote High Ex-Students Association have been actively engaged in class re-unions and information is required for our newsletters, etc.

Max Morris VK3GMM
PO Box 222
Rye VIC 3941
ar

rate). This difference can be caused by the pre-emphasis and de-emphasis in your FM transmitter/receiver not being correct. Some experimentation with audio filters between the TNC and the radio can improve the situation.

Choosing RF Power Output Level and Antennas

One of the primary causes of performance degradation on any packet channel is HIDDEN TRANSMITTERS. If your station can't be heard by most, if not all, of the other packet stations on a channel, then you are going to suffer collisions. You should, where possible, use antennas and RF power that enable you to hear as many stations on the channel as possible, NOT JUST THE LOCAL BBS OR REPEATER. A good starting power is probably 10 to 25 watts, with a reasonable omnidirectional antenna that is clear of any local obstructions.

Country stations may have difficulty hearing many stations (in many cases it will be impossible) due to terrain or distance but, in the cities, you should be able to come close. To assist in hearing other stations, your choice of operating frequency should be made carefully. Operating frequency should be based on the channel with the closest BBS or Packet repeater. If everyone else in an area did the same then the distances between all operators on a channel is

likely to be reduced and hence the probability of everyone hearing everyone else is increased

Setting Basic TNC Parameters

I will look at the various TNC parameters over coming issues. This issue I will start with the TXDELAY parameter

TXDELAY — Transmitter Keyup Delay. This parameter tells your TNC how long it has to key up your transmitter before sending any data on the channel. The TXDELAY parameter needs to be set to a value longer than the time it takes your transmitter to turn on and start sending its RF. This time period can be governed by the lockup time of the radio's synthesiser, or the pull in time of a relay. It should also be as long as the slowest squelch on the channel (although most squelches appear to operate faster than most transmitters).

A good starting point is to set this to 250 milliseconds (check your TNC or modem software manual for any multiples used in the actual command — many TNCs will use a parameter of 25 to represent 250 ms). You should either increase or decrease this parameter as required. If you are having problems connecting (and you have already set your audio levels) you could try making this parameter fairly long (say 500 ms). Make sure you can connect to someone and then slowly reduce this in increments of 50 ms until you can no longer connect. Then increase it by 50 ms and leave this set. Be aware that the TNC's default value may not always be correct for your particular station.

That's an introduction on how to connect a packet station together. There are lots of tricks and tips that can be employed.

If you are having problems getting started you should try contacting your local radio club where you are likely to find other packet operators who can help you.

Software Available

There is a large variety of packet software available for the PC. If you are using a TNC then a good basic starters' program is "YAPP" written by WA7MBL. This offers basic terminal support as well as the ability to send and receive binary files using the YAPP protocol supported by most BBS stations.

Some other packages available, as either freeware or shareware, include Packet6, LanLink, TPK, Graphic Packet, Super Packet, PTM and many others. Your final choice of software depends on the features you want. Even most telephone modem terminal programs can be used with packet TNCs. If you are looking for a good packet program (and more importantly help in configuring it) then contact your local radio club or a local packet operator in your area. They should be able to help you get started.

Conclusion

Next month I will look a little more at TNC parameters. I will also take a look at how a packet BBS station can be put together and, in particular, give an insight into the VK5TTY remote packet BBS in Adelaide

If you have a question you think would be of interest to other packet operators as well, then why not send it in to the *Packet Doctor*, c/o WIA SA Div, GPO Box 1234 Adelaide SA 5001. Your answer might appear in future editions of "Amateur Packet World".

**c/o GPO Box 1234, Adelaide SA 5001*

all

WIA News

WIA Federal Budget

The October quarterly convention of the WIA Federal Council, held in Melbourne over 29-30th of the month, considered the 1995 budget in some depth.

Forecasting a further small decline in income from membership subscriptions, together with a fall in costs in some areas, the Council looked at the Federal Office operations and decided on a conservative approach, budgeting for economies in several critical areas. Overall expenditure was set at a level below the past years' figures.

However, an increase in SMA Liaison costs was budgeted to cover travel expenses expected following a separate Council decision to boost representation over the coming year. Costs for production of *Amateur Radio* magazine were maintained at forecast levels.

In an effort to economise on Federal Office computer system costs and to further streamline office operations, the computer system software and hardware is to be upgraded, commencing in January. Bill Wardrop VK5AWM, VK5 Federal Councillor, volunteered his services to assist in this process and is to spend some time in the Federal office during January.

*** Ham Log: New Version 3.1 Release!!! ***

The Ultimate in IBM Log Programs — Acclaimed World-Wide

Immensely Powerful New Features and Superb Enhancements

3 years hard labour for just \$59! Ideal X-mas Present!

Dr Hi Fi P/L — 74 Carrington Rd., Waverley 2024

(\$5 P&P VK) Order Yours Now by Phone, Fax & Credit Card.

Phone: (02) 369 2008 Fax: (02) 369 3069

Pounding Brass

Stephen P Smith VK2SPS*

Integrated circuit technology has always fascinated me, especially the family range of IC chips the 8043, 8044, M, B, and ABM versions.

At one time or another in your amateur career you would have come across one of the abovementioned chips, and have probably replaced an older version 8043 with the newer 8044. I recently did this in my Yaesu 901DM transceiver. Or are you into home brewing an electronic keyer for personal use? These chips are symbolic to electronic Morse code reproduction where simplicity and speed are the major concerns to the operator.

Before we look at the family of IC chips, a little background history on the founder is called for. John G Curtis, founder of Curtis Electro Devices Inc was born in Bradford, Pennsylvania in 1930 and obtained his amateur call W3NSJ at the age of 17. John Curtis graduated from the Pennsylvania State University in 1952, obtaining a BS in Electrical Engineering. He joined and served with the US Navy from 1954 to 1959, during which time he was stationed in Yokosuka, Japan.

After his discharge from the navy as a Lieutenant he was employed by the Signetics Corporation, an integrated circuit manufacturer. In 1968 John founded Curtis Electro Devices, specialising in electronic keyers and Morse keyboards. His first electronic keyer was the EK-3B. Sometime later the 8043 IC chip was introduced to the American market. This chip underwent a number of design changes over the years and at present we have the 8044ABM.

Currently the company manufactures test equipment along with the ABM IC chip for the commercial market. Mr Curtis also holds the extra class call sign of K6KU.

Let us now focus our attention on the family range of integrated circuits. Starting with the 8043 and working our way through to the 8044 ABM Chips covered will include M, B and ABM versions of the 8044 IC chip.

8043 Version

The 8043 was first introduced in 1973 and was the first integrated circuit designed specifically to perform the electronic Morse keyer function. Utilising CMOS metal Gate technology using FET switching for noise immunity and low power consumption, it was then "state of the art" electronics.

The IC included a clock oscillator, debouncing circuitry for the key paddles,

logic to produce dashes and iambic mode (alternating dots and dashes when both paddles are held together), sidetone oscillator, weighting circuitry (to lengthen dots or dashes) and, finally, an output stage capable of driving the NPN Keying Transistor. Under operating conditions, 90% of the power consumed is used for driving the sidetone and output transistor.

8044 Version

Around 1975 an improved version of the 8043 was introduced to the market and its designation was changed to 8044. It included two major improvements. Firstly, it did not require a symmetry adjustment to equalise the length of dots and spaces, and it added dash memory for the true iambic operation (dashes could now be inserted reliably). Secondly, the clock oscillator was re-designed as the 8044 required a clock capacitor of one half the value used in the 3043 chip. The 1 megohm symmetry trimmer necessary for the 8043 could (and should be removed).

M Version

In 1980 the M version of the 8044 was introduced. These versions consisted of a speed indicating function to the circuit. The 8044 and 8044M were kept reasonably compatible by adding the required two new pins to the end of the package. This allowed the M version to sit in a socket designed for the plain 8044 just by allowing two pins on one end to overhang the socket. A 50 μ A analog meter is used with the speed readout (Pin 12 of the IC). I will go into greater detail in part two.

B Version

Two years later it became apparent there had developed two types of iambic keyer circuits (squeeze) keying. Type A already existed in the earlier ICs and the new type was designated type B. Basically, type B iambic is where a squeeze released during an element, say a dot or a dash will cause another alternate element to follow the one being produced. Confused? Say you want to make the letter "C". You release during the second dah (or the space following) and the last dit will automatically transmit. Presumably, this further reduces the effort to produce some letters. This chip was designated 8044B.

ABM Version

1986 saw the production of the new 8044ABM chip, a product of the latest design and processing technology available in the integrated circuit industry. This 20 pin IC rolled all the characteristics of the earlier models into a single IC package. I should bring to your attention that the 8044ABM is not pin compatible with the earlier designs. It does have

switchable type A and B iambic, switchable negative or positive weighting, and an output for an analog speed meter as mentioned earlier. Capable of A or B iambic and Meter ready, we use the suffix "ABM" (see Fig 1 for pin connections).

The 8044ABM incorporates filters which eliminate the effects of key bounce on both make and break. Another invisible quality is RF immunity, to prevent false triggering by RF on the paddle leads. The dots and dashes inputs are equipped with active pull up resistors which exhibit only few hundred ohms impedance to the power supply when the key is opened.

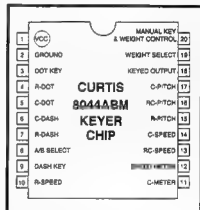


Fig 1.

Electrical Specifications

Supply Voltage	4 V DC — 12 V DC max 5-9 V DC recommended
Quiescent Current	Less than 50 μ A at 5 V DC
Operating Current	10-30 mA keydown
Speed Range	Unlimited using external R & C 6-50 wpm
Dot-Space-Dash Ratio	1: 1:3 standard, A or B iambic.
Weight Control	Weight can be + or — via the weight control pot
Sidetone Oscillator	Internal using external R & C.
Package	20 pin DIP

References

The ARRL Handbook 1980-1994
Curtis 8044 Series Information Book
Curtis 8044ABM Application Note

Next month we continue with the 8044ABM, having a closer look at its operating features. Until then I wish all readers of this column a very merry Christmas and a happy and safe New Year

*PO Box 361, Mona Vale NSW 2103

1995 WIA AUSTRALIAN RADIO AMATEUR CALL BOOK

on sale NOW at your Divisional Bookshop

Over 18500 Up-to-date Callsign Listings

Shortwave Listener Listings

Australian Repeater Directory

Australian Beacon Listings

Comprehensive Australian Band Plans

Complete DXCC Countries List

And much more, such as Australian TV Frequencies, QSL Bureaux, Slow Morse Transmissions, Accredited Examiners List, Repeater Guidelines, WIA Awards, Australian VHF/UHF Records, New Zealand Repeaters and Beacons, International Callsign Series, and so on.

As an active amateur radio operator can you afford
NOT to have this best yet Australian Call Book?

DO NOT MISS OUT!

Limited Stock

Buy your copy NOW from your Divisional Bookshop

Cover Price \$12.50

Special Price to WIA Members \$11.00

All Prices plus Postage and Handling where applicable

QSLs from the WIA Collection

Ken Matchett VK3TL* Honorary Curator WIA QSL Collection



SNØJP

No Pope in history has travelled so extensively as Pope John Paul II. The papal visit has been celebrated in several countries by the special issue of a QSL card to mark the occasion. Norway (special prefix LE3JP), XX3JP (Madeira Is), 6DAPAX (Mexico), V13PVA and HG52JP (Hungary), to name just a few. Poland, the birthplace of the present Pope, has marked his visits with QSLs of various prefixes. The card (with its special suffix as well as prefix), celebrated the papal visit to Poland in 1983. Card was donated by Radio Austria International.

VK4FFG

This is a QSL of the club station of the Australian Naval Amateur Radio Society in Brisbane. It shows some of Australia's guided missile frigates (FFGs) namely the HMAS Adelaide, Canberra, Sydney and Darwin. Hence the significance of the FFG suffix in the call-sign. Club members feature some other Australian warships on their individual cards, including HMAS Vendetta, Australian destroyer HMAS Arunta and the frigate HMAS Barwon. Card donated by Terry VK2ALG, Hon Sec of the ANARS.



VE9AL

Very few amateurs will have ever seen a Canadian QSL with the prefix VE9. This QST the station VE9CNE was featured as pre-war portable call-sign of station VE3AL. In the December 1935 issue of QST the station VE9CNE was featured as a special station set up for the Canadian National Exhibition of August and September 1935 at Toronto. Recently Canada has issued other prefixes with the nine numeral but they have been authorised for special events only, eg VY9OR (Hamfest 1993), CG9ASJ (200th anniversary of the city of Saint John in New Brunswick), and VY9CC (20 years of communication). Card donated from Estate of A B Leonard of Drouin.

CF25A

The call-sign CF25A is yet another uncommon one from Canada. It was a special call commemorating the 25th anniversary of the Canadian flag. The station was operated by the Maple Leaf Radio Society president VE3XN during February and April 1990. Card donated by Jim, operating as AS1JS from Bhutan on his 1990 DXpedition.

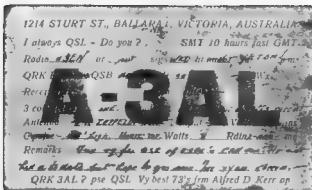
A-3AL

This was the pre-war call-sign of one of Australia's radio pioneers, Vernon Kerr. He spent over forty years as a technical officer with the Royal Flying Doctor Service operating out of such outback towns as Cloncurry, Charters Towers and Charleville. A member of the WIA, he was honoured with a life membership of that Institute. Further details can be found in the publication *Halcyon Days* by Alan Shawsmith VK4SS. Vernon went on the air in 1926 using the call A-3AL just a year before Australia started using its OA prefix (to be replaced by VK in 1929).

CQ0VV

This particularly attractive multi-coloured QSL card from Portugal celebrated the country's presidency of the European Economic Community. It shows the flags of both Portugal and the EEC. The prefix CQ zero is a relatively new one for Portugal (CT was used exclusively for many years). Things changed in 1983 when the prefixes CQ, CR, CS and CU were issued. The CQ zero prefix is reserved for the celebration of special occasions. Card donated by Roth VK3BG.





Thanks

The WIA would like to thank the following for their kind donation of QSL cards towards the collection (supplementary list):

Bill VK2XT
Athol VK3CP
Ray VK3JI
Mavis VK3KS
Stan VK3TE
Ivor VK3XB
Mike VK6HD
Quintin ex VK6QF
Richard VK7ZZ

Ronaldo PS7AB
Bob W5KNE
Paul 3B8AD.

Also the families and friends of the following "Silent Keys" (supplementary list):

A B Leonard VK3EN
Bob Stevens VK3OJ (courtesy of Herb VK3JO)
John (Jock) Vaile VK3PZ
Allen Styles VK3TV (courtesy of Philip VK3KIE)
Arthur (Art) Smith VK3UX (courtesy of Jim Linton)

Ron Bainbridge VK4BRZ

Bill Wallace VK4KHZ (courtesy of Joan VK6BJE).

Author's Note

Why not contribute to the WIA National QSL Collection and save something for the future? I especially welcome special commemorative prefix QSLs, pictorials, and thematics. I may be able to feature some of these in future columns. Arrangements can be made for large card collections.

*4 Sunrise Hill, Montrose VIC 3765 Tel (03) 728 5350

Repeater Link

Will McGhie VK6UU*

Power Supply

Power supplies for repeater sites have to be first class. A long duty cycle and reliability are needed for round the clock power for your repeater.

One of our mains powered repeater sites servicing the Perth area requires a considerable number of amps. The site houses two voice repeaters, a BBS, several digital systems and WIA News link equipment. The receive-only current runs at 3 amps and, with all systems running during the WIA News, peaks at 30 amps.

Perth experienced a major power black out at the start of 1994 with no mains power for most of the day. One casualty of this power failure was the demise of the power supply at this repeater site. Even though the equipment remained on air due to the large battery capacity of 500 ampere hours, when the mains power returned the 15 amp float battery charger suffered a major burn out. The condition of the battery charger, however, was not evident until the low battery warning tone appeared on one of the repeaters several days later.

Armed with a 4 amp battery charger (all I could find), I headed to the site. Investigation showed that the battery

charger was dead and could not be fixed on site. All that could be done was place the small 4 amp charger across the large 500 ampere hour battery bank and hope it could make some progress at keeping the site on air. With a constant 3 amp demand from the equipment, plus extra load when one or more of the six transmitters on site keyed up, there was little that a 4 amp charger could do but slow the decline in the battery condition. Quickly a 5 amp regulated supply was put together and placed in service the next day. At least for the time being both these supplies could make some headway towards charging the battery bank.

This situation showed that with only one power supply at the repeater site it was easy to be caught with your pants down. Rather than one big supply, two smaller supplies could offer better reliability. Dare I say it is unlikely for both supplies to die at the same time. However, without comprehensive monitoring one could die without being noticed and remain out of service and then, at a later time, the second one die. Just how far do you go towards making the system 100% reliable?

This possibility aside, the two power

supply system was put in place with a second larger supply being constructed to provide 12 amps. The repeater power supply system now consists of two regulated 13.8 volt units, one a 5 amp, and the other a 12 amp. These power supplies sit across the 500 ampere hour battery bank. During peak demand the battery system makes up the shortfall. The battery also provides emergency power during mains failure. This set-up works well and provides reliable power for the repeater site.

It was during the design stage of the 12 amp supply that I decided to try an idea that had been on my mind for a while. Can you parallel up the cheap, easy to obtain, 78 series regulators? These regulators provide 1.2 amps, with overload and temperature protection, all in one easy to wire up and heat sink package, but would they run in parallel, and would each supply the same current? The problem is that if one of the regulators has a slightly higher output voltage it will supply more current than the other regulators and get upset. The answer is yes! 78 series regulators can be wired in parallel provided their output voltages are within 100 mV of each other.

I obtained several 7815 regulator chips and measured their output voltages. Unfortunately, there was a surprising variation of as much as half a volt. However regulators from the same manufactured batch were within 100 mV of each other. If you can purchase regulators from the same manufacturer and the same batch, the power supply I came up with may be for you. Measure each regulator to be sure that they are all within 100 mV of each other.

Starting with a 7815 chip, the 15 volt output is dropped by 0.6 of a volt in the 1 amp diode, and with a 0.56 ohm resistor in series to help balance the current distribution between regulator chips, a 12 amp regulated supply was constructed that float charges a battery to 13.8 volts.

Note the large smoothing capacitor of 100,000 μ F. This may be on the high side but, as I had one, it was used. However,

with such a large capacitor the bridge rectifier may not like the large switch-on current surge so the 6.8 ohm resistor charges the capacitor until the relay R1 operates and shorts out the resistor. I found the relay would not operate unless there was a capacitor at the output of the bridge, hence the 5000 μ F.

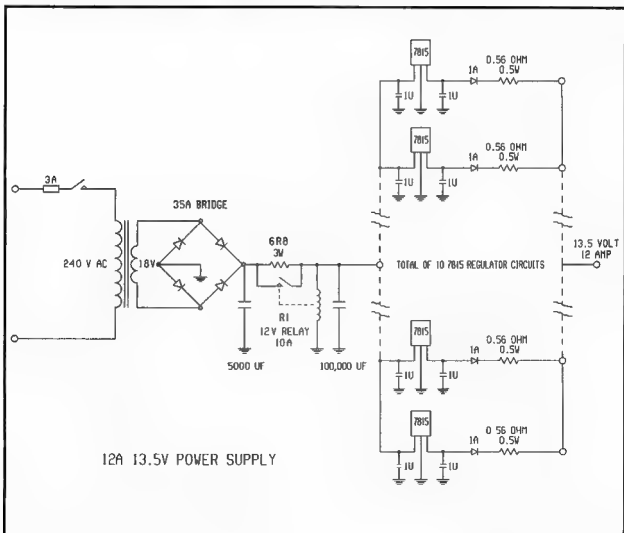
When calculating the size of the smoothing capacitor required in a power supply, there is a simple rule. For every amp drawn from a 10,000 μ F capacitor there is 1 volt of ripple. If you double the capacitor to 20,000 μ F, then 1 amp will result in half a volt of ripple. With the 100,000 μ F capacitor shown, and the supply providing 12 amps, the ripple voltage will be 1.2 volts. The 7815 regulator requires a minimal 2 volt differential between input to output to regulate. For the 7815 the input voltage must not drop below 17 volts at the bottom

of the ripple. If it does the output will contain 100 Hz hum. This may or may not be a problem when floating a battery but it is best avoided. Even a small amount of hum across a battery supply at a repeater site can find its way into equipment.

The 7815 chips require heat sinking and this is made easier as no insulation is required between the mounting surface and earth. Note the 1 μ F capacitors on each input and output of the 7815s. Without these capacitors the 7815 may become unstable.

I could go on with further thoughts on the power supply but I already have used a large slice of *Amateur Radio*. If you have any queries on the power supply, or decide to use the idea, I can be contacted as shown below.

*21 Waterloo Cr Leamurdie 6076 VK8UU @ VK8BS



Spotlight on SWLing

Robin L. Harwood VK7RH*

1994 is rapidly coming to a conclusion. Over these past twelve months we have had severe reception difficulties mainly because of the low sunspot count. The higher frequencies above 15 MHz were virtually unusable, whilst propagation on the lower frequencies was marginal to fair quite often. Although, as I'm writing this, the higher frequencies are exhibiting some activity around 1100 UTC, but this is rather temporary, I feel.

Many international broadcasters have had budgetary cutbacks, affecting programming and/or transmission output. Radio Moscow International has increasingly begun cutbacks to the extent that they are now using only 38 languages compared to about 60 at the height of the Cold War. Also, the English World Service has also reduced their transmitting output. I have noted several e-mail messages on the Shortwave Echo complaining of the difficulty in finding Moscow, especially in North America.

Some stations have disappeared from the spectrum altogether. Radio KGEI in San Francisco closed down in the middle of the year. This religious broadcaster mainly beamed into Latin America in Spanish. Another religious broadcaster, WGSN in Maine, ceased operating in October as part of the "Christian Science Monitor" network. The sender was sold about a year back to a Florida based Adventist group which is not connected to Adventist World Radio. A call sign change was mooted but I haven't heard the station since the new owners took full possession. The popular "Swiss Shortwave Merry-go-round" DX show on SRI with the two Bobs, Messrs Zanotti and Thomann, also was axed in June. There was an e-mail outcry about Swiss Radio International over this, trying to have the program re-introduced.

Despite the budgetary gloom, some broadcasters actually increased their output and influence. Radio France International is reportedly increasing the number of languages aired and is investing in additional transmitting sites in Thailand and in Africa. They have recently completed the upgrade of their French sites. The other growth area, particularly in the US, seems to be the increasing number of private religious broadcasters. To get a clear channel, many of these stations are operating well outside the normal broadcasting allocations. This has caused some interference to other spectrum users who are legitimately allocated these

frequencies by their administrations. Diplomatic protests to the American FCC have had limited success. WEWN and WSHB were forced to move off some 5 MHz channels following SMA protests that they were interfering with our RFDS communications network. Despite this, WWCR has now appeared on 5065 kHz up until 0800 UTC, and again from 1200 UTC, with "Brother Stare". The frequency choice hasn't gone down well with tropical band DXers, either.

And while I am on tropical band DXing, I recently heard a new country between 2045 and 2107 UTC. Nairobi was logged on 4935 kHz with American country & western music followed by a time check indicating it was midnight locally. Before signing off, news headlines in English were heard, followed by a Christian religious devotional. However, I found the pronunciation impossible to follow as the signal rapidly faded.

I also note that the General Overseas Service of All India Radio in Delhi, directed to Oceania, is being heard quite well now at 1050 UTC on 15180 kHz. For many years it has been rather difficult to hear AIR at this time but they have upgraded their facilities and installed new additional senders near Goa and Bangalore. Their modulation has vastly improved. Other frequencies used at this time are 15050 and 17387 kHz. Radio Pakistan in Karachi, on the other hand, are on 7085 kHz variable in local languages and English from 1030 UTC, yet their modulation is horrible as is their frequency stability. Naturally, they are in the exclusive amateur allocation but it may be a transmitter spur from 7310 kHz which is in parallel, yet Karachi has had a registration on 7085 with the ITU for some time.

Don't forget that around the Christmas New Year period, several special broadcasts are planned. The "Festival of Nine Lessons and Carols" will again be on Christmas Day at around 0935 on the BBC World Service. One of my Tasmanian cousins was privileged several years back to attend this live. She confirmed that it indeed is pre-recorded about a week prior to Christmas in King's College Chapel in Cambridge. Midnight Mass from St Peter's Basilica in the Vatican is also available on shortwave. However, I find that the relay via WEWN is better than direct from Vatican Radio.

Don't forget that on 5 January, the Orthodox Christmas is celebrated. This is due to the Orthodox communion still

being on the Julian calendar, while the majority of western churches are on the Gregorian calendar.

Also, don't forget the major ocean yacht races after Boxing Day. Not only do the Sydney-Hobart and Melbourne-Hobart races conduct their communications on HF, but also races between Queenscliff and Devonport plus Sydney to Coff's Harbour and Southport (QLD), are staged over the same period. It is a very hectic time on the channels of 4483, 2524, 2182 and 8711 kHz. The calling channel is either 4125 or 2182 kHz. All use USB.

In conclusion, may I extend my wishes for Christmas and hope that 1995 will bring in more peace and stability than we have had over this past 12 months. If you have any news, don't forget my e-mail address or Packet BBS is there. Take care and good monitoring!

*54 Connaught Crescent, West Launceston TAS 7250
VK7RH@VK7BBS.LTN.TAS.AUS.OC
Internet: robroy@clar.sapene.org.au
Fidonet: Robin Harwood 3.570312

Update

Beam Antennas With Bent Elements — Part 2

The author of this two part article, John Sproule VK2AGT, has advised us that there was a minor error in a statement two thirds of the way down column two on page four of the September issue of *Amateur Radio*.

The statement *if $\theta_{12} < 45$ deg, then $\cos \theta_{12}$ is positive and therefore $R1 = R11$. This is for a Yagi. Should read if $\theta_{12} < 45$ deg, then $\cos \theta_{12}$ is positive and therefore $R1 < R11$. This is for a Yagi.*

It might be a good idea to correct your copy of the September 1994 issue of *Amateur Radio* now.

WIA News

World Radio Sport Championship

Just in case you were thinking of joining in the fastest growing aspect of this hobby around the world — amateur radio direction finding (ARDF) — the deadline for teams entering the 1995 World Radiosport Team Championships has been extended to 28 February, 1995. The event will be held in Washington, DC, in the United States (see October WIA News).

VHF/UHF — An Expanding World

Eric Jamieson VK5LP*

All times are UTC

I hope last month's columns were not too much of a culture shock but at least you now know a little more about what makes me tick! It was unfortunate that space restrictions meant many interesting snippets of amateur radio activity, particularly during the AM days and portable operation, had to be omitted. However, my notes only make a portion of an interesting magazine and as such I am fortunate to be allowed the space that is available each month.

Australian News

John VK3ATQ sent a fax to say that between 2115 and 2130 weekdays there is activity on 50.115 MHz. John and Rupert VK3BJN are both in Melbourne and have regular contacts with David VK3DY at Maffra, Lloyd VK3KFO at Briagolong, and John VK3BQS at Sale. As the latter three have their beams pointing west John suggests stations in VK5 may hear them. The short time slot is necessary due to work commitments but they would welcome other contacts particularly from country stations.

From Port Pirie, Neil VK5ZEE sent me a packet message via Garry VK5ZK to the effect that recently he re-activated his callsign and is now active on 50, 144 and 432 MHz chasing SSB contacts. He is attempting to start a nightly net on 144.125 at 0945 and 432.125 at 1015. Contacts so far have been to VK5BWG at Port Augusta and VK5KK in Adelaide and others would be welcome. The Adelaide two metre beacon is a fairly constant S3 but the 432 beacon has not been heard.

Neil runs 10 watts on six to a 5 element beam, on two an output of 80 watts to a 13 element horizontally polarised antenna, also a 20 element crossed Yagi fitted with an elevation rotator for satellite use. On 432 he has 35 watts to two 27 element horizontal KLMs and an 11 element vertically polarised antenna. His aim is to eventually erect 4 x 13 elements for two metres EME contacts.

In the October issue of *Amateur Radio* my columns included a copy of Steve Gregory's (VK3OT) ARRL DX Century Club Award for six metres, the only one issued to an Australian amateur. In addition I have received copies of two additional certificates awarded to Steve; they are from the UK Six Metre Group, the first for working 100 countries on 50 MHz and the second the Worked All Europe Award for contacts with 20 European

countries on 50 MHz all by using CW. Good work Steve.

Mark VK5AVO ex-VK0AQ, advises that he has checked the VK5VF beacons and found six metres was OK, the two metre beacon frequency was corrected as it had drifted slightly. The 70 cm beacon antenna was broken so temporary repairs were affected but the high SWR may have damaged the unit so it will need an overhaul. The 1296 beacon is still absent.

Mark has lumbered himself with the job of rebuilding the 70 cm repeater again (!) after which he plans to construct 10 GHz equipment for his own use. Sandwiched somewhere will be time to re-erect his six metre antenna in readiness for the Es season.

A note from Steve VK5AIM drew my attention to a paragraph in the VK5 Journal in the August issue of *Amateur Radio* which announced that Adelaide's first six metre repeater is being tested. When ready the South Coast Radio Club will install the FM repeater on Chandlers Hill. Transmit frequency is 53.750 and receive 52.750 MHz. I hope to be advised

when the repeater is fully operational so that readers throughout Australia will know of its existence.

Steve also sent information from *Radio Communication* for June 1994 indicating that Rex VK8RH has built a beacon to be operated from Jakarta in Indonesia on 50.042 MHz with the callsign YB0ZZ. No other details are available.

Contacts

The Ross Hull Memorial VHF-UHF Contest commences at 0000 Monday 26 December 1994 to 2400 Saturday 28 January 1995 and all bands above 30 MHz may be used. Single operator only and one contact per station per band per UTC day. RS or RST numbers plus a three-digit serial number to be exchanged plus location or Maidenhead locator of station worked — this to allow for the computing of distances.

Logs must be received by Monday 20 February 1995 and should be posted to: WIA Ross Hull Contest Manager, PO Box 2175, Caulfield Junction, VIC 3161.

The above is a very brief outline of the contest mainly to draw your attention to it. Full details were published on page 34 of last month's issue of *Amateur Radio*. The Contest Manager makes the usual request that DX calling frequencies should be kept clear as much as possible.



From left: Geoff GJ4ICD/JY8IC, Mohammad JY4ME, Nick G3K0X/JY80X, HRM Prince Raad JY2RZ and Neil G0JHC/JY8JH in the JY7SIX shack housed in the Marriott Hotel, Amman, Jordan.

Print courtesy of GJ4ICD.

The 1995 VHF-UHF Field Day will take place on 14/15 January 1995 and will run in parallel with the Ross Hull Contest with rules much the same as in previous years (see the Contests column in this issue of *Amateur Radio*).

Doug VK4OE telephoned to say he would be operating in the Field Day Contest from a suitable site near Dorrigo in northern NSW on all bands from six metres to 2304 MHz. Given reasonable conditions he expects contacts to Sydney and Brisbane on 144 and 432 SSB to be relatively easy and special attention will be given to 1296 MHz. If conditions and circumstances permit he will try 2304 MHz with anyone so equipped.

He will be calling and listening on 144.100, 432.100 and 1296.100 and will shift up 15 kHz on each band for any sustained operating. On 50 MHz the frequency will depend on band conditions and there should be no problems with Es contacts. If Doug cannot be reached on 144 or 432 then you might try telephoning him on 018 191 066 while out in the field!

Overseas News

From the same publication is a Locator Squares Table which shows G3IMV at the top with 1139 squares comprising 434 on 50 MHz, 15 on 70, 513 on 144, 125 on 430 and 52 on 1.3 GHz. He is closely followed by Geoff GJ4CD with 611 on 50, 1 on 70, 264 on 144, 121 on 430 and 68 on 1.3, for a total of 1085 squares. In addition there are 15 operators with scores above 500 squares. All this indicates what can be done when you live in a region with a high

density of amateur radio operators spread over a large area.

In a letter from **Neil G0JHC** received in June I missed an interesting point. He said that the day after returning from a stint at operating JY7SIX, the Jordanian DXpedition station, he managed to work the station. He mentioned the station has been heard several times over the 4000 km distance. The Jordanian beacon is JY6ZZ and operates on 50.075 MHz. It was built and donated by Lawrence GJ3RAX and Geoff GJ4ICD.

But then Neil writes that on 10/6 JY7SIX worked into North America on multi Es at over 10,000 km! That's a long haul for Es with at least four hops involved and this is rare indeed. I will try and obtain more details of the contact/s and report later. Also, see photograph.

Ted Collins G4UPS reports that **Leif Johansen LA9ZV**, became a Silent Key on 30/8 as the result of a heart attack at the age of 49 years. Many stations in Australia would have worked Leif on six metres. Also, **George Heeringa PA0FM** became a Silent Key on 19/8 at the age of 73 years. George will be remembered also for his operation on six metres as P43FM.

Ted also provides an interesting comment on the state of six metres in the UK. *Has it been a good or bad season? Although there have been very few openings across "the pond", from here in Devon I have worked/heard 65 countries since 1 January 1994 up to 15 August. Several countries like ZD8 are included as heard because only the beacon is operational. I guess newcomers will feel*

very pleased to have more than 60 countries worked in such a short space of time! Indeed, VK5LP

From the USA

Emil Pocock W3EP in his World Above 50 MHz in QST for October 1994 has the news for which I have been waiting. That concerns the monumental contacts which occurred from 11 to 14 July 1994 when so many bands opened from USA to Hawaii, in the process setting two world records. I had known for some time that the spanning of that path had occurred but was lacking details. Let Emil tell you about the interesting occurrence.

The reliable transpacific duct outdid itself this season, replacing sporadic-E doings as the lead story for July. Jack Henry N6XQ called the session "the granddaddy of all 2 metre Hawaii openings". Not only did stations from Oregon to Mexico make contact with the islands on two metres, but the first 2304 MHz Hawaii-to-California QSO was completed and the 902 MHz record extended. Excited stations on both ends of the path made hundreds of contacts on 144 through 1296 MHz, many of them on FM and through FM repeaters.

As usual, the KH6HME beacons atop Mauna Loa, Hawaii (BK29go) gave California the first inklings that the duct had formed across 4000 km of Pacific Ocean. N6XQ (DM12) in San Diego heard the two metre beacon weakly on July 3 and 5 and it was loud enough on the 9th to alert the Hawaiians. N6XQ and KH6FOO made a contact soon after. By the 11th Jack heard the Hawaiian beacon at 20 dB over S9 as Paul Lieb, KH6HME himself, arrived on top of the mountain around 2000Z to begin a hectic two days of operating.

Stations all along the West Coast were waiting and when Paul made his first call on 144.170 MHz he was swamped with frantic S9 mainland stations and the pile-up remained throughout the day and into the next. By the time the opening died out on the 13th, Paul had filled 16 pages of log, including 148 QSOs on 144 MHz, 6 on 222 MHz, 29 on 432 MHz and 3 on 1296 MHz. Paul made only one contact each on 902 and 2304 MHz but both were record-breakers.

N6XQ and KH6HME finally made it on July 13 at 2240Z to extend the transpacific 902 MHz tropo record to 4060 km. Paul's 12 W signal from a short loop Yagi was 529 in California, while Jack's 15 W to a 22 element Yagi was received 519 on the big island.

In the midst of all the excitement on the lower bands, Chip Angle N6CA set up his microwave equipment at the Palos Verdes City Hall near Los Angeles and at 2321Z

WIA News

Voice Repeater for MIR Space Station

An upgrade planned for the Russian MIR space station, a popular platform for amateur radio in space activities, should see a 2 m to 70 cm FM voice repeater operational within the next two years, according to a report from 12th Annual Meeting and Space Symposium of the Radio Amateur Satellite Corporation (AMSAT-NA). Held in Florida, USA, in early October, the symposium marked the 25th anniversary of AMSAT.

Other developments outlined at the Florida meeting covered progress on planning for the "Phase 3D" satellite. Due for

launch in mid-1996, Phase 3D will be the largest, and most complex amateur satellite ever assembled.

Among the array of ground-to-satellite (uplink) channels planned is one in the 21 MHz (15 m) HF band. Others will be in the various VHF, UHF and microwave bands. Assembly of the Phase 3D satellite is proceeding on schedule, it was reported. It will be about 2.1 metres in diameter. Meanwhile, it seems the popular OSCAR 13, on which many amateurs "cut their teeth" in amateur space communications, is fated for a fiery death in early December when it is scheduled to re-enter the atmosphere. Thanks to the *ARRL Newsletter* for details.

on July 11 Chip made a 2304 MHz contact with KH6HME for the first Hawaii-to-California contact on that band. The distance was 3979 km. Both stations ran 12 W to 4 foot dishes. Signal reports were 559 both ways.

Unusually strong signals gave some hope that contact could be made on 5760 MHz and 10 GHz as well, but these efforts were not successful with a number of stations spending many hours trying to span the Pacific on 10 GHz, despite the booming signal on 1296 MHz. The wide coverage of the opening was remarkable. Several other Hawaiian stations participated with 144 and 432 SSB/CW gear. KH6HME also worked XE2EED (DM12) in Tijuana, Mexico. The opening extended as far inland as Reno, Nevada.

Hundreds of contacts were also made on two metre FM, both direct and through Hawaiian repeaters, most notably the 147040 machine on Mauna Loa. Many mobile and even hand-held stations spanned the 4000 km to Hawaii.

KH6HME also made the first successful ATV transmission from Hawaii to California on 440 MHz using 100 watts with the

signal peaking to P4 (nearly snow-free). Paul's equipment was not configured for reception so an ATV two-way could not be made at that time.

Bruce KK6TG, one of those who tried to make the grade on 10 GHz, went up and down the mountains on July 12 and 13 in the Bay area making measurements of signal levels from Hawaii. He found that signal strength rose gradually from sea level to 600 feet and then held constant until about 3500 feet. Bruce saw an extremely sharp inversion boundary, visible as a layer of dark smog, cutting through distant Mount Diablo at about 3800 feet. At 4300 feet he could not hear KH6HME at all. This suggests that the responsible inversion lay just over 3500 feet (1100 metres) altitude in the Bay area, entirely consistent with observations of similar transpacific ducts.

Well, that 2304 MHz contact puts paid to the record held by Reg VK5QR and Wally VK6WG since 17 February 1978 at 1883 km and dashed my hopes of extending the distance to 2000 km by working VK6WG from Meningie. I think the only world record we still hold is the 144 MHz contact on 15 April 1991

between VK4BFO and J17DMB at a distance of 6763 km but I am open to correction

Closure

There is little else to report other than to say that if normal circumstances prevail then Es should be excellent particularly during late November through to early January. Be mindful of two metre contacts when Es conditions are at their best.

Thank you to those who have supported this column during the year by forwarding information. Best wishes to everyone for a happy Christmas and may the New Year be as you would like it.

Closing with two thoughts for the month:

- 1 Success is being able to hire someone to mow the lawn while you play golf for exercise, and
- 2 The pain in the neck you complain about may be the result of looking backwards.

73 from The Voice by the Lake.

*PO Box 169, Meningie SA 5204
FAX: 085 751 043 Packet to VK5ZK for VK5LP

ar

Technical Correspondence

All technical correspondence from members will be considered for publication, but should be less than 300 words.

Interfering Telephone

I have recently suffered from interference to reception on 80 metres which was caused by a neighbour's cordless telephone when hung up! The phone in question was a Telephone Tech CT630.

The interference took the form of a mixture of local broadcast stations appearing at spots around 3.5 MHz, the loudest being on 3447 kHz at S9. There were other signals spaced every 9 kHz.

My station is only 5 km from the local AM broadcast transmitters and the telephone lines are overhead. Apparently the phone line was picking up the broadcast stations and the phone mixing them. The interference was not audible at a friend's house about 300 metres away.

I tried installing an Amidon FT-140-77 ferrite core with 21 bifilar turns as a common mode choke and reduced the interference from S9 to S4. A pair of 2.5 mH RF chokes in series with the line removed the interference completely.

However, the solution finally adopted was for me to repair the plug pack used

with my neighbour's previously defunct phone and restore it to service. The offending phone was returned to K Mart for a full refund.

I was unable to contact the manufacturers of the phone, their only contact information being a telephone

number, now disconnected. Also, I was unable to find a supplier of approved RF filters for use with telephones.

Richard Rogers VK7RO

15 Coolamon Road

Taroona TAS 7053

ar

Silent Keys

Due to space demands obituaries should be no longer than 200 words.

The WIA regrets to announce the recent passing of:-

J G (Geoff)	MYERS	VK2UA
J L C	HART	VK3BJY
T N	BROWNLOW	VK5NAF
V D (Doug)	HUMBLE	VK6NDJ
H J (Harold)	BRACKEN	VK7BR
R (Rick)	BRAY	VK7ZZ

John Geoffrey Myers VK2UA

We regret to announce the passing in early October of John Geoffrey Myers VK2UA. First licensed in 1938 as 2YI, Geoff was a founding member of the Manly-Warringah Club (now the Manly-Warringah Radio Society, of which he was a life member).

Born at Neutral Bay, Sydney, in 1913, Geoff was the first President of the Zero Beat Club and a member of the Harrington's Radio Club. He served with the Australian Armed Forces from 1939 to 1945 as Captain, and later company Commander, with the 4th Division Signals in New Guinea.

After a break of some years, Geoff was re-licensed as VK2UA in 1978 and maintained a keen interest in amateur radio until his passing at age 81. Geoff will be greatly missed by his family and many friends in amateur radio.

Richard Murnane VK2SKY, on behalf of the Manly-Warringah Radio Society

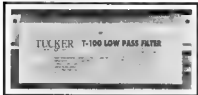
ar

What's New

Bob Tait VK3UI* introduces new products of interest to radio amateurs

New Low Pass Filters from Tucker

Tucker T-100 1500 Watt Low Pass Filter



Every radio shack should have a low pass filter to insure against problems of TVI from harmonics. The new Tucker T-100 utilises a 9 pole Chebyshev design with a cut-off frequency of 35 MHz. Attenuation at 40 MHz is -70 dB and -60 dB at 65 MHz worst case. The insertion loss is 0.25 dB at 30 MHz with an SWR of less than 1.5:1 and an impedance of 52 ohms. This unit is rated at 1500 watts continuous, and comes with a 1 year warranty. Not bad for \$US49.95

Tucker T-150 2500 Watt Low Pass Filter



Tucker claim that this is the first 2500 watt low pass filter on the amateur market which is designed to work with high power linear amplifiers. The specifications are the same as its smaller brother but with a higher power rating. The price for this unit is \$US109.00

Both units are available direct from Tucker Electronics and Computers, PO Box 551419, Dallas TX 75355-1419, USA; Fax 214 348 0367

**Have you advised
the WIA Federal
Office of your new
Callsign? Use the
form on the
reverse side of the
Amateur Radio
flysheet.**

Now Hear This! An Audio Booster for your Handheld.



Marvel Electronics Inc have released the HTS-2 audio booster for your handheld transceiver. It comes complete with an internal battery supply and charger unit. A special battery saver circuit shuts off the audio, reducing the battery drain to 1 milliamp, whenever your handheld is squelched for more than 10 seconds. The amp turns on again the instant the squelch opens to produce 1.4 watts into a 3.5 inch oval speaker. A small LED indicates battery saver mode.

A DC power jack and voltage regulator allow you to operate the HTS-2 from external voltage sources (5-15 VDC), or from a standard wall pack. The internal batteries are charged from the external power source. The HTS-2 can accept either + or - ground inputs, so there are no problems about getting it wrong. The unit also has bypass mode and comes complete with 1.5 metres of audio cable. Check these specifications:-

Frequency range	200 — 15,000 Hz.
Input impedance	Variable (100 Ω nominal)
Maximum input	400 mV
Output power	1.4 watts at 4 Ω
Size	69.8 mm x 114.3 mm x 63.5 mm
Weight	2.2 kg
Colour	Silver/Grey

The HTS-2 is available from ZRV Electronics Pty Ltd, PO Box 469, Eltham VIC 3095. Ph (03) 439 3389 or Fax (03) 439 2483 for further details.

NIR-10 Digital Noise and Interference Reduction Unit.



The NIR-10 is designed to connect to the audio output jack of your receiver/transceiver to enhance the received audio quality of voice and CW signals. Using advanced Digital Signal Processing Techniques (DSP) the unit is able to recognise SSB signals and improve the signal to noise ratio.

Unlike conventional audio bandpass filters, the NIR-10 can actually remove those annoying noises and heterodynes without affecting the speech itself.

There are 4 modes of operation: NIR to reduce or eliminate, heterodynes, white noise, ignition noise, RTTY interference and power line noise; PK (peak) function to reduce white noise (this can be used alone or in conjunction with the NIR mode); NF (notch filter) mode, which removes multiple heterodynes and acts in 3 microseconds, and BP (bandpass) mode — the centre frequency is continuously adjustable, it provides selectable bandwidth, extremely steep skirts, and greater than 60 dB rejection.

A Bypass mode removes all processing delay, but allows the Peak and Notch functions to be used in real time. Connections on the rear panel allow the unit to be bypassed whenever the transmitter is keyed. The NIR-10 is powered from a standard 12 volt DC supply and consumes 1 amp peak. A volume control mounted on the front panel adjusts the output level of the inbuilt audio amplifier and the output is 2 watts into a 3.2 Ω load. A convenient phone jack is also provided.

For further information contact, ZRV Electronics Pty Ltd, PO Box 469, Eltham VIC 3095. Ph (03) 439 3389 or Fax (03) 439 2483.

*C/o PO Box 2175, Caulfield Junction VIC 3161

ar

HF PREDICTIONS

Evan Jarman VK3ANI

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for five of the bands between 7 and 28 MHz. The UTC hour is the first column, the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1 μ V (dBu) at the MUF, the fourth column lists the "frequency of optimum travel" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 μ V in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50 μ V at the receiver's input and the S-meter scale is 6 dB per S-point.

V in 50 ohms	S-points	dB(μ V)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4

0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST The major part of NSW and Queensland.

VK SOUTH Southern-NSW, VK3, VK5 and VK7

VK WEST The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used in these calculations is 22.0. The predicted value for January is 20.7.

VK SOUTH — SOUTH PACIFIC

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	17.8	18	14.4	-9	23	18	11	0
2	18.1	19	14.9	-8	23	18	11	0
3	18.1	19	14.9	-8	24	19	12	1
4	18.1	20	14.8	0	25	20	13	1
5	18.0	21	14.7	6	27	21	13	1
6	17.9	23	14.6	16	30	24	16	1
7	18.0	25	14.7	31	34	25	18	2
8	17.9	27	14.5	45	37	26	18	2
9	17.4	28	14.0	52	38	26	15	0
10	16.6	29	13.5	52	37	25	12	-1
11	16.2	30	13.0	53	36	23	10	-7
12	15.5	31	12.4	53	35	20	7	-11
13	15.0	31	11.9	53	34	18	4	-15
14	14.4	31	11.2	52	31	14	1	-19
15	13.3	31	10.2	51	27	9	-9	-33
16	12.4	32	9.5	50	24	3	-18	
17	12.3	33	9.4	50	24	3	-16	
18	12.1	31	9.1	44	22	-2	-17	
19	12.6	25	9.5	26	20	4	-12	-35
20	14.2	22	10.5	14	22	10	-2	-21
21	15.9	21	12.0	5	23	15	5	-8
22	17.1	20	13.1	1	24	16	9	-3
23	17.6	19	13.7	5	23	18	11	-1
24	17.8	19	14.2	-8	23	18	11	0

VK WEST — SOUTH PACIFIC

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	17.8	18	14.4	-9	23	18	11	0
2	18.1	19	14.9	-8	23	18	11	0
3	22.0	18	15.3	37	19	17	11	1
4	22.0	18	15.3	37	19	17	11	1
5	22.0	18	15.3	37	19	17	11	1
6	21.9	18	17.9	-17	23	23	19	12
7	21.8	20	17.7	0	28	26	21	13
8	22.0	22	17.9	16	33	29	24	15
9	21.8	24	17.9	33	37	31	25	16
10	21.2	25	17.1	44	40	32	25	15
11	20.5	26	16.4	46	40	32	24	13
12	19.8	27	15.5	50	40	31	23	11
13	18.9	28	15.0	52	40	30	20	8
14	18.3	28	14.4	51	39	29	19	6
15	17.2	29	13.3	51	37	26	15	1
16	15.5	30	12.6	50	35	23	11	-7
17	14.9	31	11.4	50	33	19	7	-10
18	14.8	30	11.2	46	32	16	6	10
19	14.7	28	11.1	30	28	16	4	-11
20	15.2	22	11.6	14	24	16	8	-17
21	17.3	19	13.6	-5	22	18	11	0
22	19.5	17	14.7	-21	20	19	15	8
23	21.0	17	16.1	-32	18	20	16	9
24	21.4	18	16.7	-38	17	19	16	10

VK EAST — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	15.3	12	10.9	32	12	9	3	7
2	14.5	7	10.8	7	5	-1	-12	-2
3	14.1	5	11.0	-4	4	0	-10	-10
4	16.7	8	12.5	2	8	2	3	4
5	19.2	7	13.4	-2	0	7	7	-2
6	19.0	7	13.3	0	0	6	6	-1
7	19.1	7	13.4	0	7	6	2	2
8	19.0	7	13.3	0	7	6	2	2
9	19.0	7	13.3	0	3	9	7	2
10	18.9	10	13.2	7	11	9	3	3
11	18.6	13	13.2	11	13	10	3	3
12	18.1	15	13.4	-34	15	15	10	2
13	17.3	17	13.2	-15	19	16	10	0
14	18.8	20	12.8	3	23	18	10	0
15	16.1	24	12.3	24	28	19	10	-3
16	15.2	27	11.7	35	29	18	8	-11
17	14.4	28	11.1	40	29	17	5	-17
18	13.9	30	10.6	43	29	15	2	-15
19	13.7	30	10.3	46	29	15	1	-18
20	14.4	30	9.9	45	30	17	5	-12
21	13.7	26	9.4	28	25	13	1	-18
22	13.4	22	8.3	13	20	10	-1	-17
23	13.5	18	9.3	-2	17	8	-1	-18
24	14.1	15	9.8	-16	15	9	0	-12

VK SOUTH — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	15.3	16	11.5	15	18	11	4	8
2	15.8	13	12.0	-28	13	11	4	-8
3	18.2	12	13.8	-11	12	8	1	-4
4	19.2	11	13.8	8	12	10	4	0
5	19.0	10	13.8	-5	10	8	3	0
6	18.1	9	13.8	-3	9	8	3	0
7	18.0	9	13.6	-3	9	8	3	0
8	18.1	13	13.5	3	9	8	3	0
9	19.5	10	13.9	-5	10	9	4	0
10	19.3	11	13.6	-6	12	10	4	0
11	18.9	13	13.3	-3	11	13	10	4
12	18.1	15	12.7	-32	15	15	11	2
13	17.3	17	12.1	-17	19	16	10	1
14	18.5	20	11.5	0	22	17	10	-1
15	16.1	24	11.2	21	27	19	10	-2
16	15.4	27	10.7	34	30	19	9	-5
17	14.9	28	10.3	40	30	18	7	-9
18	14.3	29	10.0	43	30	17	4	-12
19	14.2	30	9.9	45	30	16	1	-13
20	14.5	30	10.2	48	31	18	6	-11
21	14.7	27	10.2	38	29	17	5	-10
22	14.4	24	10.0	33	25	14	3	-12
23	14.5	21	10.2	11	22	13	3	-11
24	15.2	19	10.7	0	20	14	5	-7

VK WEST — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	14.1	20	10.8	7	25	18	10	1
2	14.6	16	11.0	-8	17	10	0	-13
3	18.7	14	13.1	-27	15	12	8	-4
4	18.9	14	13.1	-27	15	12	8	-4
5	20.4	12	15.1	-10	14	11	1	8
6	20.4	11	15.7	8	12	11	8	1
7	20.4	11	15.7	7	12	10	5	0
8	20.4	11	15.7	7	12	10	5	0
9	20.2	11	15.4	8	12	10	5	0
10	20.4	12	16.5	10	13	11	8	1
11	20.1	13	16.5	10	13	11	8	1
12	19.6	16	15.8	-31	17	13	7	3
13	19.0	18	15.2	-11	22	19	14	5
14	18.3	21	14.6	8	26	21	14	3
15	17.4	24	13.9	29	31	23	14	1
16	16.3	27	13.1	39	33	23	14	1
17	16.2	27	13.1	43	33	22	11	-4
18	15.3	29	11.9	46	32	20	8	-8
19	14.8	30	11.2	47	31	17	4	-13
20	14.4	30	10.7	47	30	15	2	-15
21	13.8	30	10.4	47	29	14	1	-18
22	14.5	30	10.9	47	31	17	4	-13
23	15.0	29	11.1	31	28	19	10	-8
24	14.1	24	10.6	24	24	19	14	-18

VK EAST — ASIA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	25.0	15	20.2	-39	20	22	20	15
2	25.0	14	19.9	-41	18	22	20	15
3	26.8	13	20.8	-18	22	21	18	1
4	27.8	13	21.0	-19	23	22	18	1
5	28.6	14	21.7	-38	21	25	24	20
6	28.1	17	22.2	-34	24	27	26	22
7	27	20	22.1	-14	28	28	22	22
8	25.9	19	21.8	8	33	31	28	21
9	24.9	21	20.1	32	39	34	29	21
10	23.2	22	19.2	41	41	35	28	20
11	22.9	23	18.5	46	42	34	28	18
12	23.0	20	17.5	49	41	33	25	14
13	21.1	20	16.0	40	40	30	20	8
14	18.8	22	14.2	32	36	24	13	-2
15	15.8	23	12.9	50	32	18	4	-14
16	15.5	24	11.8	49	29	12	3	-24
17	14.3	24	11.0	48	25	8	-11	-35
18	12.6	26	9.5	36	20	4	-18	-46
19	9.7	28	7.5	41	-3	-38	-	-
20	9.8	27	7.6	30	-2	-37	-	-
21	14.3	20	10.6	27	26	4	-11	-34
22	14.2	16	10.4	5	28	23	17	7
23	23.4	17	16.6	-17	25	25	21	14
24	23.9	16	19.4	30	21	23	20	14

VK SOUTH — ASIA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	19.8	14	15.8	-14	16	12	5	5
2	20.0	14	16.3	-13	15	12	5	5
3	20.6	14	17.0	-13	16	13	7	7
4	20.6	14	17.2	-13	16	13	7	7
5	20.9	15	17.2	-17	17	14	8	8
6	20.7	15	17.0	-30	17	18	15	8
7	20.5	17	16.7	-26	20	20	18	8
8	20.5	18	16.6	-7	25	23	18	9
9	20.5	18	16.3	-22	26	24	18	9
10	19.6	25	15.6	40	37	28	20	9
11	19.0	26	15.2	45	37	28	19	6
12	18.3	26	13.6	48	37	26	18	2
13	17.6	23	13.8	49	34	21	9	-20
14	18.2	22	12.9	48	34	21	14	-2
15	14.6	23	11.2	47	24	5	-12	-36
16	13.6	23	10.3	46	20	1	-20	
17	12.7	23	9.7	45	16	-8	-30	
18	11.0	24	8.4	42	5	25		
19	8.6	26	7.7	32	-20			
20	8.6	26	6.7	34	-20			
21	12.6	19	9.6	26	12	8	-26	
22	17.7	19	13.4	6	34	18	10	2
23	17.7	18	13.4	-30	17	18	10	2
24	19.5	15	15.3	30	17	17	12	

VK EAST — EUROPE										VK SOUTH — EUROPE										VK WEST — EUROPE									
UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9	
1	9.3	2	7.3	-21	0	-13	-30	...		1	10.0	4	7.7	-16	2	-11	-27	...		1	10.5	13	8.1	3	5	-13	-32	...	
2	9.3	-10	6.3	-24	1	-15	-32	...		2	10.0	4	7.7	-16	2	-11	-27	...		2	10.5	13	8.1	3	5	-13	-32	...	
3	7.9	-15	6.2	-28	...	0	-11	-32	...	3	8.5	-12	6.7	-25	1	-13	-29	...		3	8.9	-4	7.0	-20	2	18	36	...	
4	8.6	13	6.5	-35	...	0	-11	-32	...	4	9.6	-10	7.3	...	0	-6	-20	-39	...	4	10.3	-3	7.8	-34	0	-10	-24	...	
5	11.4	-4	8.0	1	-2	-13	...	5	12.6	-2	10.1	...	0	-1	-6	-21	...	5	13.7	-2	10.9	...	2	0	-8	-21	...
6	14.6	2	11.9	1	-2	-13	...	6	16.5	3	13.3	...	0	3	1	7	...	6	18.0	6	14.5	...	2	5	3	-4	...
7	17.9	6	14.3	3	6	-4	-3	7	19.5	6	15.7	...	-1	8	5	0	...	7	21.2	7	17.1	...	1	8	7	2	...
8	20.3	9	16.3	5	10	0	...	8	21.8	8	17.4	...	-1	8	5	0	...	8	23.6	8	19.1	...	0	9	10	6	...
9	21.8	12	17.7	12	15	13	7	9	21.6	11	17.5	...	2	10	11	7	...	9	24.8	9	20.2	...	0	9	10	6	...
10	22.6	16	17.9	-14	23	22	18	11	10	21.3	14	17.2	...	8	14	14	10	...	10	24.8	11	20.0	...	5	13	13	10	...	
11	22.3	18	18.0	13	30	26	21	12	11	20.8	17	18.7	-37	18	19	17	11	...	11	24.0	12	19.9	...	11	18	15	11	...	
12	20.3	20	17.1	30	34	27	20	10	12	20.1	22	16.1	2	28	25	20	12	...	12	22.3	15	18.8	...	22	21	22	18	...	
13	19.4	22	15.3	38	34	25	18	4	13	19.4	23	15.3	30	33	25	19	8	...	13	22.0	17	17.7	...	16	20	25	19	...	
14	18.6	24	13.3	42	31	19	7	-9	14	17.5	23	13.9	37	31	21	11	-3	...	14	19.0	20	15.1	...	32	31	23	14	...	
15	13.7	26	10.9	43	24	7	-8	-31	15	14.5	25	11.5	41	26	11	-3	-22	...	15	15.9	23	12.5	...	38	28	15	3	-14	...
16	11.0	28	9.0	40	13	-10	-32	...	16	11.7	28	9.6	41	27	-4	-24	16	12.9	25	10.8	...	40	20	2	-15	-39	...
17	9.4	29	7.4	37	9	-28	...	...	17	10.1	29	7.9	39	8	-18	...	...	17	11.2	27	9.7	...	43	10	-10	-32	...	...
18	8.5	30	6.6	35	...	...	...	...	18	8.1	30	7.1	37	1	-29	...	...	18	10.1	28	7.8	...	38	8	-20	...	...
19	8.2	30	6.4	34	-6	...	...	...	19	8.9	30	6.9	36	0	-32	...	...	19	9.7	28	7.5	...	38	4	-24	...	...
20	8.2	30	6.3	34	-6	...	...	...	20	8.8	30	6.7	36	-2	-34	...	...	20	9.4	28	7.2	...	37	2	-27	...	...
21	8.3	24	6.4	27	-6	...	...	...	21	8.8	28	6.7	33	-1	-32	...	...	21	8.4	29	7.2	...	37	2	-28	...	...
22	8.5	17	6.8	15	-3	-30	...	...	22	8.6	29	6.6	30	-4	-32	...	...	22	8.6	29	7.5	...	38	3	-25	...	...
23	9.2	9	7.1	0	0	-18	...	...	23	9.0	14	7.0	9	0	-23	...	...	23	9.8	25	7.5	...	31	5	-21	...	...
24	9.8	4	7.5	-12	1	-14	-32	...	24	10.3	10	7.9	-5	5	-11	-28	...	...	24	9.8	19	7.8	...	17	4	-18	...	...

VK EAST — EUROPE (Long Path)										VK SOUTH — EUROPE (Long Path)										VK WEST — EUROPE (Long Path)									
UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9	
1	8.9	9	6.7	-30	...	0	-10	-23	...	1	8.3	-12	6.3	-25	1	-13	-29	...		1	8.0	-36	6.1	...	-11	-21	-36	...	
2	8.3	3	6.3	-34	...	0	-10	-23	...	2	8.8	-10	6.5	-22	0	-13	-28	...		2	8.4	-10	5.8	...	-10	-20	-35	...	
3	9.8	2	7.6	-19	3	-8	-22	...	3	9.2	0	7.1	-19	0	-14	-30	...		3	9.7	-12	6.9	-31	-3	-13	-27	...		
4	9.8	5	7.4	-11	3	-10	-26	...	4	8.8	2	6.9	-6	0	-18	-36	...		4	8.4	-10	6.8	-34	-3	-18	-32	...		
5	8.8	7	8.7	0	...	...	-18	-38	...	5	7.8	4	8.1	1	-10	-36	...		5	7.4	-11	5.8	-15	-6	-24	...	...
6	8.8	11	8.4	8	...	...	-18	-38	...	6	7.9	5	8.6	3	-10	-36	...		6	7.5	-10	5.8	-15	-6	-24	...	...
7	9.1	22	7.2	23	4	-18	...	...	7	8.1	21	6.4	23	-7	-37	...		7	7.8	0	6.0	-2	-8	-31	...	...	
8	11.8	25	9.4	32	17	0	-17	-32	...	8	10.3	22	7.4	24	5	-14	-36	...		8	10.5	10	7.8	3	0	-16	-37	...	
9	13.2	28	10.6	32	22	9	-3	-17	...	9	12.1	25	8.4	33	12	-15	-36	...		9	12.4	14	11.1	11	1	-16	...	...
10	11.8	18	10.0	8	...	...	-17	-32	...	10	9.5	22	7.4	24	5	-17	-36	...		10	9.6	21	9.0	24	13	-3	-20	...
11	18.3	12	12.8	-36	11	10	5	-3	...	11	9.8	15	7.4	9	4	-14	-33	...		11	9.7	16	7.5	12	4	-15	-34	...	
12	17.7	9	14.0	...	...	...	...	...	12	13.9	12	10.9	-17	11	5	-4	-16	...		12	10.1	9	7.7	-2	-4	-11	-27	...
13	16.2	13	13.7	...	...	...	...	...	13	7	15	9	11	7	1	-15	...		13	14.1	11	11	-32	2	5	-2	-18	...
14	16.0	0	12.4	14	16.0	2	10.4	...	1	4	1	-9	...		14	16.2	5	11.0	...	2	5	-2	-4	...
15	15.1	-4	11.0	15	14.3	-2	10.0	...	-3	1	0	-7	...		15	15.5	-1	10.7	...	-4	1	0	-6	...
16	13.2	-6	11.0	16	13.2	-6	10.0	...	-3	1	0	-7	...		16	14.6	-1	10.6	...	-4	1	0	-6	...
17	14.2	-6	11.1	17	14.0	-7	9.5	...	-4	0	-2	-8	...		17	14.1	-1	9.6	...	-5	-3	5	-12	...
18	14.1	-6	10.7	18	12.9	-8	10.2	...	-4	0	-2	-8	...		18	12.3	-12	9.4	...	-5	-4	9	-19	...
19	11.4	-14	8.9	19	10.4	-22	8.2	...	-16	-17	-14	-28	...		19	9.8	-33	7.8	...	-12	-14	-34	-22	...
20	12	-22	8	20	9.8	-22	8.2	...	-16	-17	-14	-28	...		20	9.8	-33	7.8	...	-12	-14	-34	-22	...
21	8.8	-31	6.9	...	...	...	...	...	21	7.8	...	6.1	...	-26	-36	...	...		21	7.4	...	5.8	...	-39	-34	...	...	...
22	8.5	-24	8.5	...	...	...	...	...	22	7.8	...	6.9	...	-26	-36	...	...		22	7.2	...	5.8	...	-39	-34	...	...	...
23	8.4	-19	8.4	-38	0	-8	-30	-38	...	23	7.8	...	6.9	...	-26	-36		23	7.2	...	5.8	...	-39	-34
24	8.5	-15	8.5	-34	0	-8	-30	-38	...	24	7.9	-25	6.1	-38	5	-17	-32	...		24	7.6	...	5.8	...	-39	-34

VK EAST — MEDITERRANEAN										VK SOUTH — MEDITERRANEAN										VK WEST — MEDITERRANEAN										
UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9		
1	8.2	7	6.3	-19	-2	-19	-38	...		1	8.0	-5	6.1	-13	-4	-23	...		1	7.5	5	5.7	3	-12	-39	...	...	
2	7.8	-19	6.0	-25	-3	-18	-38	...		2	7.6	-15	5.8	-22	-4	-21	-3	...		2	7.1	-6	5.7	-7	-12	-39	...	...
3	17.2	6	13.3	...	...	...	...	...		3	18.1	-3	14.0	...	1	6	-19	-33	...		3	16.2	7	12.5	...	6	8	-1	-12	...
4	23.5	8	16.0	...	...	...	...	...		4	22.1	10	16.1	...	0	9	10	8	...		4	22.1	8	18.6	...	6	11	9	4	...
5	26.8	9	18.8	...	...	...	...	...		5	22.1	11	16.8	...	0	9	10	8	...		5	22.1	10	18.6	...	6	11	9	4	...
6	26.8	9	18.8	...	...	...	...	...		6	22.1	11	16.8	...	0	9	10	8	...		6	22.1	10	18.6	...	6	11	9	4	...
7	25.5	12	20.7	...	...	...	...	...		7	22.0	9	17.8																	

HAMADS

TRADE ADS

● **AMIDON FERROMAGNETIC CORES.** For all RF applications. Send business size SASE for data/price to RJ & US Imports PO Box 431, Kama NSW 2533 (no enquiries at office please)

14 Boany Ave Kiama Agencies at Geoff Wood Electronics Sydney Webb Electronics, Albany Assoc TV Service, Hobart Truscotts Electronic Word, Melbourne and Mildura: Alpha Tango Products, Perth

● **WEATHER FAX** programs for IBM XT/ATs *** "RADFAX2" \$35.00, is a high resolution shortwave weatherfax. Morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which) Needs SSB HF radio and RADFAX decoder ***

"SATFAX" \$45.00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver *** "MAXISAT" \$75.00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) plus documentation, add \$3.00 postage. ONLY from M Delahunty, 42 Viliers St, New Farm QLD 4005. Ph (07) 358 2785.

● **THE ANTENNA EXPERIMENTER'S GUIDE.** By Peter Dodd G3LDO. 200 Pages, 120 illustrations, includes material not previously published. Building simple RF test equipment for measuring resonance, Z and field strength. Antenna optimising & VHF modelling. Computer measurement & mathematical modelling. Masts and experimental antennas. Price \$49.50, inclusive of P & P & Airmail. Cash SAUS or Visa. Obtainable, Peter Dodd, 37 The Ridings, East Preston West Sussex BN16 2TW, UK.

● **STOCK REMNANTS, BUSINESS CLOSED.** All brand new loom equipment with full warranty. IC-R7100 VHF/UHF receiver \$2,000, AH-7000 D scope Antenna \$200, TV-7100 TV Adaptor for R7100 \$250, IC-707 HF Transceiver \$1,500, IC-728 HF Transceiver \$1,850, IC-R72A Receiver 0.1-30 MHz \$1,250, AH2A Automatic Antenna Tuner \$600, AH2B Mobile Antenna \$150, IC-2SAT 2 m Portable Transceiver \$300, SM8 Base Microphone \$160, SM20 Base Microphone \$180, Brian Stares, PO Koondrook, VIC 3580 Phone (054) 53 1300.

FOR SALE ACT

● **YAESU FT200 HF txcvr w/FTV550 6 m txvtr, 10 m preamp. AC and DC psu \$200, BWD 421A dual trace 12.5 MHz CRO (juls) \$30, TCA1674 6 m FM txcvr (\$5 each, \$55 fitted) \$10, 2 FM TCA1675 txcvrs w/52, STG132 60 W 2 m FM base txcvr, 5 ch fitted, scanning Rx, rftnt \$30, ST5 RTTY demod & oop psu \$6, AMSTRAD PC1512 (mono) w/books, software etc \$50, AMSTRAD PC2086 w/books & s/ware, but no HD or mon \$30, VIM 6502 s/board computer, books, appl notes ASCII kb & monitor \$10;**

DATAPRODUCTS 8012 NLO/graphics printer (minor us) \$30; MONO EGA monitor \$10, HP3439A DVM with HP3445A \$20; ORIGINAL software w/manuals, licenses, boxes, etc. Drawperfect & WP Office \$50; MS Fit Sim 3.0 \$20; MS FS Scenery Designer \$20; HARVARD GRAPHICS v3.0 \$80, v2.3 \$50; VENTURA Publisher for Windows Gold v3.0 \$150, QUATTRO PRO v4.0 \$80, v3.0 \$20, v2 \$10, PARADOX SE v1.0 \$30; ADOBE type Manger for Win \$20, PUBLISHER'S Powerpack v2.0 DOS (scalable fonts for WP, LPerf, MSWord, MSWorks) \$20; Free to good homes, Heathkit Suxer (6 m AM), model 15 teleprinter w/p-tape and loop psu. Moving QTH, prices ONO. Mark VK6QI/1 (06) 259 1995.

FOR SALE NSW

● **EIMAC tubes 4CX1500B \$95, CHANGE OVER RELAYS ceramic frame new \$40, MEGGER & leads good condition \$175, VACUUM relay Jennings & mount \$55; FILAMENT transformer Gresham 2/6.5 V 12 amp new oil filled \$50. Plus freight. Ron VK2DTR (02) 918 3835.**

● **KAYPRO portable computer 10 m HDD lots of legal software \$450, CITIZEN LSP-10 printer \$125, HEWLETT PACKARD Vectra computer 1.44 M & 386K FDD \$275; NEW valves 807 \$10, EF50 \$5. SASE List. VK2WS QTHR (067) 75 2158.**

● **FRG-9600 Software for EGA/VGA PC, APOSRCH fast search with disk/printer logging, APOSCAN multiple scan windows, digit frequency data base, disk/printer logging, CATRS232 interface included, \$195 both. Tony Richardson VK2APO (02) 310 0426.**

● **KANTRONICS KPC3 VHF TNC with cables and program \$200. Steve VK2YR (02) 821 1803.**

● **LINEAR 2 m Tokyo Hi-power HL-180V, all modes, switchable power 170 W/100 W, switchable pre-amp, requires 13.8 VDC, as new, never installed \$650, STANDARD CNB161 nicad battery pack 700 mAh for standard 2 m handheld, good condition \$60, YAESU FT-4700 dual band 2m/70 cm mobile, with front panel separation kit for secure boot mounting (YSK1) long 6 metre cable version), brand new, never unpacked \$1190 (\$400 under price) brand new model including mounting kit. Fred VK2KQH BH (02) 906 5855 otherwise (018) 640 377.**

● **DECEASED ESTATE RACAL Universal counter 12 MHz type SA535 (not working); AWA Harmonic generator type 10A50065 s/n 92; NO NAME (?) Kilovolt meter MCCES 1944 s/n 732, GENERAL Radio Co inductance bridge type 667A s/n 518, BRUEL & KJAER deviation bridge type 1504 s/n 85225; RADIO equipment Uniscopes (ex DCA s/n 32) s/n 189; MEGA 500 volts no 970573, ZENER diode tester (home brew) well made piece of gear, AWA marker generator type A51740 s/n 130; NO NAME direct current ammeter (Dept Def) Vicral (?)**

HOME BREW digital frequency meter (web-built) blue case, KEITHLEY Instruments (Clev, Ohio) guarded differential voltmeter model 660A s/n 37693, SIEMENS level meter 200 — 620 kHz model no D2055, KLIRANALYSATOR 30 Hz to 50 kHz model KLA 48 s/n 7480F, MUIRHEAD resistance box type A-25-LS s/n 162374, PLESSEY telegraph distortion measuring set Tx s/n 177 5CBV, similar piece of equipment No description, only identification ATE British patent No 6521126, FAIRCHILD Camera & Instrument Corp, signal generator TS-452 A/U s/n 189, MISSION Radio heterodyne frequency meter type CKB-74028 s/n 6086 (M13) with calibration book; MATSUNAGA MFG Co Ltd slide regulator (VARIAC) type SD 282.1, BERCO Rotary Regovolt (VARIAC) 2 amp type 42A s/n 6648; HICKOK model 133B millimeter s/n 5029F, PHILIPS PseudoRandom Generator O-model 4 s/n 7522 210 00510 HOME BREW variable power supply 0-24 volts approx 2 amps, TEKTRONIX type 422 oscilloscope s/n 006315 (with instruction manual & probes) HOME BREW variable power supply 5 volts, TVC dial & telegraph impulse sender type DATIS 101 s/n 52, HEATHKIT digital IC tester model IT-7400, RHODE & SCHWARZ Polyskop III type SWOB BN 42472 (inst book), FAIRCHILD 766H/F dual trace type 79-02A s/n 7997, FLUKE differential volt meter model 825A s/n 1653, SYSTRON DONNER counter timer mode 1034 s/n 100, GENERAL Radio Mass modulator pulse generator type 1395-A s/n 334, HEWLETT PACKARD model 214A pulse generator s/n 4140192, SCHOMANDL KG Munchen (Ph) ps-TMC) type ND1M + Q2 s/n 8710, BALANTINE Laboratories Inc direct capacitance meter model 520 s/n 679, MARCONI Instruments beat frequency oscillator model TF195M s/n 6229, TELEQUANT oscilloscope type 543 s/n 33101, SOLARTRON Digital voltmeter model LM1620 200 mv-1 kV s/n 200054, MARCONI Instruments signal generator type TF144G s/n B317, SEFRAM Galvanometer type GTA1 SE Laboratories Ltd UV recorder 3006 model 758/2, SIEMENS 0.2-160 kHz/level oscillator W222 s/n 6/080323, PHILCO Sierra Electronic Operation envelope delay test set model 340B s/n 629, PHILIPS levelmeter LF 30 c/s 15 kV HF 4 c/s-660 kHz STMA434/20 s/n 18 PH LIPS Attenuator unbalanced 600 ohm type STM 604/10 PHILIPS PM 2454 AC: millivoltmeter 2 Hz-2 MHz s/n B2809, HEWLETT PACKARD 522B electronic counter s/n 249-05810, DAWE type 441A wide range oscillator s/n 1101, YAESU frequency counter 30-200 MHz s/n 5C 416115, MICOVAC electronic test meter s/n 224022, PHILIPS voltmeters model GM6012 s/n BF 6216, PHILIP GM6020 s/n D 2689, model 6025 s/n D852, BWD model 506 Oscilloscope s/n 35800. All offers to WIA NSW Division PO Box 1066, Paramatta NSW 2124, or phone Michael (02) 626 9288.

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with strictly.

VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

TYPESETTING AND PRINTING:

Industrial Printing and Publishing Pty Ltd, 122 Dover Street, Richmond, 3121.
Telephone: 428 2958

MAIL DISTRIBUTION:

R L Polk & Co Pty Ltd, 96 Herbert St, Northcote, Vic. 3070. Tel: (03) 482 2255

CONTRIBUTIONS TO AMATEUR RADIO

Amateur Radio is a forum for WIA members' amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of AR. A photocopy is available on receipt of a stamped, self addressed envelope.

BACK ISSUES

Available only until stocks are exhausted. \$4.00 to members, which includes postage within Australia.

PHOTOSTAT COPIES

When back issues are no longer available, photocopies of articles are available to members at \$2.50 each (plus \$2.00 for each additional issue in which the article appears).

The opinions expressed in this publication do not necessarily reflect the official view of the WIA, and the WIA cannot be held responsible for incorrect information published.

ADVERTISERS INDEX

Amateur Radio Action	13
ATN Antennas	23
A J & J Coman Antennas	28
Call Book	83
Daycom	5
Daycom Catalogue	29
Dick Smith Electronics	25, 26, 27
Dr Hi Fi	81
Emtronics	16, 17
ICOM	IBC, 7
Kenwood Electronics	IFC
Strictly Ham	11
Terlin Aerials	79
Tower Communications	73
WIA Divisional Bookshops	IBC

Trade Hamads

M Delahunty	94
RJ & US Imports	94
Peter Dodd G3LDO	94
Brian Stares	94

HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 2175
Caulfield Junction, Vic 3161

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms:.....

.....

Call Sign (if applicable):.....

Address:.....

.....

.....

State and Postcode:.....

WIA Morse Practice Transmissions

VK2BWI Nightly at 2000 local on 3550 kHz

VK2RCW Continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm

VK3COD Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz

VK3RCW Continuous on 144.975 MHz 5 wpm, 10 wpm

VK4WIT Monday at 0930 UTC on 3535 kHz

VK4WSS Tuesday at 0930 UTC on 3535 kHz

VK4WCH Wednesday at 1000 UTC on 3535 kHz

VK4AV Thursday at 0930 UTC on 3535 kHz

VK4WIS Sunday at 0930 UTC on 3535 kHz

VK5AWI Nightly at 2030 local on 3550 kHz

VK5RCW Continuous on 144.975 MHz, 5 wpm to 12 wpm

VK6WIA Nightly at 1930 local on 146.700 MHz and nightly (except Saturday) at 1200 UTC on 3.555 MHz.

WIA Divisional Bookshops

The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division)

	Ref	List Price		Ref	List Price
ANTENNAS					
Ant. Compendium Vol 2 Software 5.25" IBM Disk	BR293	\$20.00	MORSE CODE		
Antenna Compendium Vol 2 — ARRL	BR292	\$32.00	Morse Code — The Essential Language	BR223	\$16.00
Antenna Impedance Matching — ARRL	BR257	\$52.00	Morse Code Tapes Set 1: 5-10 WPM — ARRL	BR331	\$24.00
Antenna Note Book W1FB — ARRL	BR179	\$26.00	Morse Code Tapes Set 2: 10-15 WPM — ARRL	BR332	\$24.00
Antenna Pattern Worksheets Pkt of 10	BR292	\$3.00	Morse Code Tapes Set 3: 15-22 WPM — ARRL	BR333	\$24.00
Easy Up Antennas	MFJ38	\$39.25	Morse Code Tapes Set 4: 13-14 WPM — ARRL	BR334	\$24.00
G-QRP Antenna Handbook — RSGB — 1992 1st Edition	BR452	\$22.50	Morse Tutor 3.5" IBM Disk	BR187A	\$30.00
HF Antenna Collection — RSGB	BR301	\$44.00	Morse Tutor Advanced 3.5" IBM Disk	BR328A	\$40.00
HF Antennas for All Locations — Moxon — 2nd Edition	BR188	\$45.00	Morse Tutor Advanced 5.25" IBM Disk	BR328	\$40.00
Antenna Compendium Vol 1 — ARRL	BR183	\$26.00	OPERATING		
Novice Antenna Notebook — DeMaw W1FB — ARRL	BR182	\$26.00	Amateur Radio Awards Book — RSGB	BR297	\$25.00
Physical Design of Yagi — 3.5" IBM Disk	BR388B	\$20.00	Amateur Techniques — G3WA — RSGB	BR393	\$36.00
Physical Design of Yagi — 3.5" Mac Disk Excel Format	BR388A	\$20.00	DXCC Companion — How to Work Your First 100	BR345	\$16.00
Physical Design of Yagi 5.25" IBM Disk	BR388	\$32.00	DXCC Country Listing — ARRL	BR385	\$5.00
Physical Design of Yagi Antennas — The Book	BR388	\$32.00	Locator Map of Europe — RSGB	BR398	\$5.00
Practical Antennas for Novices	BR35	\$19.00	Log Book — ARRL — 9" x 11" Wire Bound	BR202	\$9.00
Practical Wire Antennas — RSGB	BR296	\$32.00	Low Band DXing — John Devolders — 2nd Edition 1994	BR195	\$45.00
Reflections Transmission Lines and Antennas — 5.25" IBM	BR348A	\$20.00	Operating Manual — John Devolders — 4th Edition	BR182	\$40.00
Reflections Transmission Lines and Antennas — ARRL	BR348	\$32.00	Operating Manual — RSGB	BR359	\$31.00
The Antenna Handbook — ARRL 1994 edition with disk	BR370A	\$65.00	Passport to World Band Radio	BR346	\$45.00
Transmission Line Transformers — ARRL	BR329	\$40.00	Prefix Map of the World — RSGB (laminated)	BR397	\$25.00
Yagi Antenna Design — ARRL	BR184	\$40.00	RTTY/AMTOR Companion ARRL 1st Ed 1983	BR45	\$21.00
HANDBOOKS					
ARRL Handbook — 1995	BR369	\$66.00	The Complete DXer — W1WNI	BR194	\$32.00
Electronics Data Book — ARRL	BR201	\$32.00	Transmitter Hunting	BR222	\$43.00
Radio Communication Handbook — RSGB	BR296	\$44.00	World Grid Location Atlas — (Maidenhead Locator) — ARRL	BR197	\$13.00
Radio Theory For Amateur Operators — Swainston — 2nd Ed	BR285	\$47.50	PACKET RADIO		
Space Radio Handbook — G4MHU — RSGB	BR439	\$47.00	AX.25 Link Layer Protocol — ARRL	BR178	\$21.00
World Radio TV Handbook	BR450	\$40.00	Gateway to Packet Radio 2nd edition — ARRL	BR189	\$32.00
HISTORY					
200 Meters and Down 1965 — ARRL	BR198	\$21.00	RG28tra	BR468	\$45.00
50 Years of the ARRL — 1961	BR196	\$8.00	Packet Computer Networking Conference No 8 1989 — ARRL	BR295	\$20.00
Bright Sparks of Wireless	BR194	\$44.00	Packet Radio Companion ARRL 1993 1st Edition	BR285	\$22.00
Down of Amateur Radio	BR195	\$58.00	SATELLITES		
World at Their Finger Tips	BR38	\$23.00	Satellite Anthology — 1994 3rd Edition — ARRL	BR476	\$24.00
INTERFERENCE					
Radio Frequency Interference — ARRL — 1992 Edition	BR186	\$40.00	Satellite Experimenters Handbook	BR177	\$12.00
The Radio Amateurs Guide to EMC	BR36	\$25.00	Space Almanac — ARRL	BR299	\$50.00
MISCELLANEOUS					
Amateur Radio for Beginners — RSGB	BR292	\$13.50	Weather Satellite Handbook — ARRL — 5th Edition 1994	BR324	\$45.00
Beyond Line of Sight	BR459	\$26.40	Weather Satellite Handbook Software 5.25" IBM Disk	BR326	\$20.00
Design Note Book W1FB — ARRL	BR357	\$20.00	VHF/UHF/MICROWAVE		
For Steps in Radio — Doug DeMaw W1FB	BR445	\$14.00	Microwave Handbook Vol 1 — RSGB	BR318	\$38.00
G-QRP Circuit Handbook — G. Dobbs — RSGB	BR381	\$31.00	Microwave Handbook Vol 2 — RSGB	BR437	\$57.00
Ham Radio Communications Circuit Files	MFJ37	\$24.95	Microwave Handbook Vol 3 — RSGB	BR447	\$57.00
Help For New Hams — DeMaw — ARRL	BR308	\$36.00	Spread Spectrum Source Book — ARRL	BR365	\$52.00
Hints and Kinks — 13th Edition — 1992	BR330	\$24.00	UHF/Microwave Experimenters Manual — ARRL	BR325	\$52.00
I Love Amateur Radio Car Bumper Sticker — RSGB	BR466	\$2.75	UHF/Microwave Experimenters Software — ARRL	BR327	\$20.00
I'm On The Air Sticker	BR466A	\$2.75	VHF Companion — ARRL	BR461	\$21.00
Low Profile Amateur Radio	BR46	\$17.50	VHF/UHF Manual — RSGB	BR267	\$40.00
Novice Notes, The Book — QST — ARRL	BR298	\$16.00	WIA MEMBERS SUNSHINES		
QRP Classics — ARRL — QST	BR323	\$32.00	Log Book Covers		\$16.00
QRP Note Book — DeMaw — ARRL	BR170	\$26.00	WIA Badge — Diamond		\$4.00
QRP Operating Companion — ARRL — 1992 1st Ed	BR010	\$16.00	WIA Badge — Diamond With Call Sign Space		\$4.00
Radio Auroras — RSGB	BR381	\$30.00	WIA Badge — Traditional Blue		\$4.00
Radio Buyers Source Book — ARRL — Volume 1	BR377	\$40.00	WIA Badge — Traditional Red		\$4.00
Radio Buyers Source Book — ARRL — Volume 2	BR3772	\$40.00	WIA Car Bumper Stickers		\$0.50
Slow Scan TV Explained	BR39	\$30.00	WIA Car Window Stickers		\$0.50
Solid State Design — DeMaw — ARRL	BR171	\$32.00	WIA Tape — Sounds of Amateur Radio		\$7.00
Technical Topics Scrapbook	BR37	\$35.00	WIA PUBLICATIONS		
Understanding Basic Electronics	BR454	\$37.50	Australian Radio Amateur Call Book — 1994		\$12.50
			Band Plans Booklet		\$2.50
			WIA Log Book — Horizontal or Vertical Format		\$5.00
			WIA Novice Study Guide		\$1.50

Not all of the above items are available from all Divisions (and none is available from the Federal Office).

If the items are carried by your Divisional Bookshop, but are not in stock, your order will be taken and filled as soon as possible.

Divisions may offer discounts to WIA members — check before ordering. Postage and packing, if applicable, is extra.

All orders must be accompanied by a remittance.

The prices are correct as at the date of publication but, due to circumstances beyond the control of the WIA, may change without notice.



You can always teach an old dog new tricks.

Icom innovation continues! We're keeping pace with all the latest trends in communication. Even a crafty old dog like Icom's Duncan Baxter, VK 3LZ, is impressed. Three of our new radios...the IC-281H(2m), IC-481H(70cm) and IC-820H (dual band) have facilities for packet operation at 9600bps plus each model is loaded with today's other wanted features.

And the IC-820H is especially designed for satellite operation.

Call Duncan and the Icom team for a brochure or the name of your nearest dealer.

Icom Australia 7 Duke Street Windsor Victoria 3181

Free Call : (008) 338 915 Ph : (03) 529 7582 Fax : (03) 529 8485 A.C.N. 006 092 575



IC-281H



IC-820H